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FARMING

BY
EDGAR W. PHILO

FARMING

WITH

ALFALFA BACTERIA CULTURE

BY

EDGAR W. PHILO



FIRST EDITION

1916



NEW THOUGHT

*In Regard to Building Up Abandoned
Farms and Improving Good Ones.*

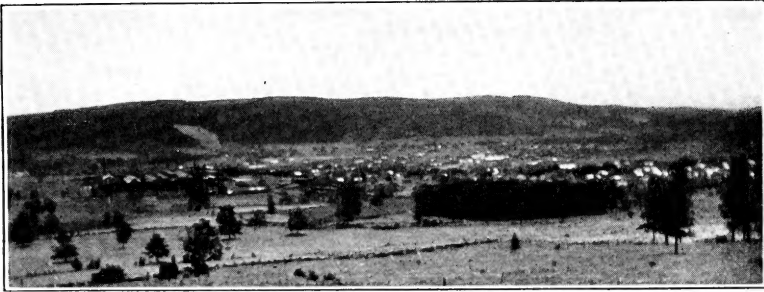
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A birdseye view showing some of our hill farms. Alfalfa is now growing at the highest point.

INTRODUCTION.

To make a poor farm profitable without investing more than the original cost of the land is a subject that has had the most careful thought and study. Farm publications, agricultural books and experimental station reports are filled with good advice furnishing statistics, formulas and theories that are often found valuable.

There seems to be a lack of information, however, about many of the little things one should know regarding the germination of seed, what is best for the plant each day as it struggles between life and death for its existence, if it fails to become thoroughly established and does not reach maturity the reason for such failure; and when it does grow to perfection the reason for such growth, except in a general way without furnishing any definite knowledge from which to base such opinions.

We are all interested in any plan that will increase our income and give us time to enjoy some of the pleasures that are essential to make us contented and happy. It is believed that the discoveries made and things recently learned from experience will go a long way toward bringing about these most favorable conditions in

a simple, easy way that will be found practicable for anyone to adopt who owns or works a farm.

Some of the things learned that are herein explained have thrown new light on the subject of farming and by taking advantage of the knowledge gained some of the poorest fields are responding with yearly productions, fully five times greater in value than the original cost of the land.

Realizing the importance of accomplishing results without making radical changes and also without the investment of large sums of money, an effort has been made along lines that would help the average farmer and especially those who find it difficult to get satisfactory returns.

Details of the work for growing alfalfa and the necessary bacteria are the only ones given as one's success is assured after once getting alfalfa established, when all other crops can be grown to perfection on ground where alfalfa or sweet clover has been plowed under. A few hints and suggestions about other things in connection with the farm are briefly referred to that the reader may better understand some of the methods employed to convert alfalfa into money.

Although some of the discoveries made and referred to are only of recent origin, the results on our farms are plainly noticeable in comparison with the surrounding farms, and there has been a steady, annual increase in the production and profits. It will be a pleasure to hear from those who follow these instructions and it is hoped that the results will be equal to those I have had.

E. W. PHILO

DISCOVERIES.

One of my recent discoveries which, I believe, is of the greatest value is in learning the nature of the alfalfa plant from the time the seed first germinates until it



These two jars were filled with soil from one of our poorest fields. The soil where the larger plant is shown had an application of alfalfa bacteria culture. The seeds were planted the same day and had the same care.

comes to maturity. A study from seed tests, soil tests and from numerous experiments has plainly shown some things about the growth and development of the alfalfa

plant not generally known. When the conditions of heat and moisture are best for the germination of the alfalfa seed, a root growth, a quarter of an inch long will appear in twenty-four hours after planting. A moist



The same plants as shown in No. 1, after shaking the dirt from the roots. Note the number of branch roots on the larger plant that furnish nourishment and that hold the plant in position on ground that heaves with the frost.

soil with a temperature of 75 to 80 degrees is most favorable for early germination. On account of this rapid development about 90 per cent. of the new growth will consist of moisture.

The rapid development and the tender nature of the sprouted alfalfa seed causes the plant to be very tender and easily killed. Fields of newly seeded alfalfa consisting of five to ten acres where nearly every seed had started to grow, have been completely destroyed three days after sowing the seed, on account of the tender sprouts being overheated from the direct rays of the sun. From these losses we have learned that a sun temperature of 85 to 95 degrees, during the summer months, will kill every alfalfa sprout before it reaches the surface or is within one-quarter of an inch of the surface soon after planting. In every case these results were had when an effort was made to follow the best instructions obtainable at the time.

Some one has stated that they have been successful in growing alfalfa by planting the seed in June and others have reported success with August planting and, I doubt, if there is one of these who can state their reason for success or any one who can say why they were not successful when failing to secure a good stand by planting at the season of the year referred to above.

The writer was probably the first to discover and publish facts relative to the value of alfalfa in the production of the best eggs for hatching and for the vitality and rapid growth of the chickens. From these experiments the value of alfalfa as a poultry food was learned and when our farms were purchased the things we had in mind were to grow alfalfa and clover and even though the former owners told us that neither of these crops could be grown on their land we were determined to make a trial and after a very few years are now har-

vesting several hundred tons of alfalfa hay annually. At the present rate of increase we should get fully a thousand tons each season within two or three years.



Some of the potatoes where the yield was over three hundred bushels to the acre grown on land that had been practically abandoned.

ABANDONED FARMS.

There is no farm too poor or worn out to produce many things profitably and by their production the land is made better year after year until crops requiring the richest land can be grown successfully.

There are many ways to make a good living from a poor farm. If the soil, the climate and the markets were the same in every section of the country where this book will find its way to the farmers homes, it would not be so difficult to outline a plan and furnish complete instructions, for everyone to follow, that would result in the greatest success in the shortest space of time.

Poultry, hogs, sheep and cattle can be made to thrive and return large profits on the poorest soil. To

make them the most profitable, however, there should never be more kept on the farm than it will support and the farmer will have time to care for. Poultry, or any of the animals, should never be kept unless they can be given the best care. It does not require a great number of them to furnish a good living on a very poor farm and at the same time gradually make fertile fields for growing bumper crops.

Before fields of sweet clover or alfalfa are ready to be harvested the number of animals kept should be limited, although there is seldom a farm too poor to grow Dwarf Essex Rape or some of the other leguminous, annual plants that will furnish the best food for poultry, hogs and cattle, the same season it is planted.

There was never a better time or brighter prospects for large profits from poultry, eggs, pork, mutton, beef, milk and butter than at the present time and those who are in position to take advantage of the opportunity will be amply rewarded. While all or some of these things, even in a small way, will help to pay living expenses at first, besides helping to build up the land it is believed that the fertility in poor soil can be completely restored or supplied from plant growth alone, although, the time required to make the work profitable will be greater than when the plan of farming is more diversified.

The experience one has in building up a poor farm will be of the greatest value in keeping up the farm after it has been improved, or in handling the best farms in a way to realize the greatest profits without permanent injury to the land.

IMPROVING THE FARM.

The most difficult part in connection with building up a farm without purchasing fertilizer or fertilizing elements is to provide a sufficient income for a year or

two, while the improvements are being made. While it is possible to receive some benefit within a few months after commencing the work of re-establishing fertility the real advantages are not so plainly noticeable until the second year and, of course, with a continuance of the same methods there will be an increase in produc-



Sweet clover that would cut five tons to the acre on land where corn grew only a foot high. The land is now fitted for growing 150 bushels of corn or 300 bushels of potatoes to the acre.

tion, year after year. While there are numerous plants that can be used for re-establishing fertility, it is believed that alfalfa and sweet clover will be found the best agencies on nearly all farms and under widely, varying conditions.

There is such a large percentage of farmers who must realize something as quickly as they can to meet outstanding accounts that they do not look with a great deal of interest on any plan that would require a year or more to return an income. They do not realize that

experiments can be tried in a small, inexpensive way that will teach them how to handle each separate field of their farm to the best advantage.

Farmers who have but a small income cannot afford to be radical when making plans for farm improvements, neither is it necessary. Most failures in all branches of business are the direct results of starting in too large a way or plunging into some kind of business without first having sufficient knowledge of the work. Nearly every farmer could make more clear money and with less labor by tilling a smaller acreage and doing the work better.

Purchasing and applying the material that has been exhausted by continuous cropping is too expensive for the average farmer and the benefit derived from such applications will not be permanent. It is true that deep ploughing and subsoiling on most land will gradually bring the mineral elements near the surface and thereby help to re-establish fertility. While this process of getting new mineral elements where they can be used by the growing crops can be made a success, it is not considered necessary in localities and on land that will grow alfalfa or sweet clover successfully, by adopting the system of inoculation and planting as referred to in this book. In addition to restoring the mineral elements it also adds humus which furnishes nitrogen and retains quantities of moisture through the dry season which are probably the most important factors in growing farm crops to perfection.

Thorough tillage is of the greatest importance in growing alfalfa or in fact any other crop as it improves the physical condition, separates and shifts the position of soil particles bringing them in different relation to each other and causing new chemical action between different fertilizing elements that is instrumental in

making the plant food available. To promote new chemical action there must be a complete change in the relative position of soil particles. This, of course, practiced continuously would result in depleting the soil of the necessary plant food, were it not for the fact that all of the fertilizing elements can be quickly restored and increased, through the agencies of sweet clover, alfalfa and other plants of a like nature.

ALFALFA ON THE SMALLEST FARM.

The smallest farms can grow alfalfa successfully even though they may not be provided with plows, harrows, drills, etc. It would certainly pay to grow alfalfa even though it were necessary to spade the ground, fit it with a garden rake and sow the seed by hand. A full month's labor for one man fitting an acre of land and sowing alfalfa would be a good investment. When one does not have the necessary time to prepare an acre of land in this way and is not in a position to purchase the necessary seed a small plot should be started even though it may not be more than a few square rod. A pound of seed will make quite a substantial showing and after once sowing even a very small field it is comparatively easy to increase the area each year until there is enough alfalfa growing to meet the requirements of the farm. A small beginning in this way if followed up year after year will result in a greater financial success than would be considered possible without knowing from experience the value of alfalfa.

THE BEST SEASON OF THE YEAR FOR SOWING ALFALFA SEED.

In nearly every section of the country where there is from four to six months cold winter weather the seed sown early in the spring has many advantages over late spring, summer or fall sowing. The month when con-

ditions are best will vary according to climatic and weather conditions. In New York State the most desirable conditions are generally had during the last half of April or the first half of May. Some years, however, the seed can be sown to advantage early in April and other years it has been impossible to get the land in proper condition for sowing the seed until the last of May.

The early spring sowing makes better fields of alfalfa, as the ground is then moist and cold and the seed does not germinate as quickly as in warmer weather, neither do the plants grow as rapidly during the first week. Because of the delayed process in germinating the plant is much hardier and there is not any danger of its being killed by excessive heat which has been the case with a great many fields sown in June, July and August. During these warm months when the conditions of heat and moisture are most favorable for rapid germination, the seed will sprout in twenty-four hours and the young plant will often appear above ground two days after sowing the seed. On account of this rapid process of sprouting and growing the plants are very tender and are easily killed by the sun on a hot summer's day. In several fields we have had a good stand of alfalfa plants one day and nearly every plant killed the next day. The direct rays of the sun were too hot for the tender sprouts as they are composed almost entirely of water the first day after sprouting. This never occurs in the spring when the ground is cool, the plants are then hardier and the sun is not warm enough to injure them.

All the articles I have seen on growing alfalfa, have advised against sowing the seed until after all danger of frost is over. In my own experience I never had a field of alfalfa injured by the frost that was sown in the early

spring. Some of our fields were frozen so hard, last spring, that a loaded wagon could be drawn over the ground without breaking through the crust and the plants that were only just out of the ground were not injured by the frost.

A test was made one year sowing seed late in October. When only about half of the seed had germinated the weather turned cold and the ground was



The fourth crop of alfalfa on land that had a heavy application of litter from the poultry coops, in addition to the alfalfa bacteria culture.

frozen and did not thaw until the following spring. It was really a surprise to find plants, in the spring, with only two of their primary leaves still alive and growing. These plants lived because the fields were completely covered with snow from fall until spring. We had two of these fields sown four years ago on very poor, hard ground that heaves with the frost and they are still in excellent condition, cutting more hay this season than in any of the former years. This practice,

however, is not to be recommended as the small plants could hardly be expected to live during the average winter.

Another advantage in spring sowing is on account of the plants growing the root system more rapidly than tops. The cool weather promotes root growth and the moist ground offers less resistance to their growth than they find during the dry weather. Any one who has had experience in driving fence posts during the summer and also in the spring of the year can readily see that the roots of the plants can reach the subsoil with less difficulty than during dry weather. If the plants are well established when the heat increases and the ground commences to dry out the roots of the plants will keep on growing and will follow the moisture, even though, it may not be found nearer than two to three feet from the surface and we have frequently had plants make roots four feet long the first year. It does not take a philosopher to see that the plant so well established is in better condition to go through the winter than one of a smaller size that is grown from summer and fall seeding.

All things being considered it is believed that the best time for sowing alfalfa seed is at the beginning of the best growing season and just as early as the ground can be harrowed leaving a fine, pulverized surface. In tropical and semi-tropical countries the alfalfa plant will do best when sown at the beginning of the coolest weather provided there is sufficient moisture to grow the plant until it is about four weeks old when there should be a root system penetrating the soil about four inches and the plant hardy enough to force the roots for moisture during the drier season. Alfalfa may be sown and produce successful stands at other seasons of the year. There is too much risk, however, in sowing the

seed during the late spring, summer and early fall unless there is an opportunity to sow it immediately after an excessive rainfall so that there may not be any danger of losing the moisture one inch from the surface while the plants are growing the first two or three weeks after the seed has been sown.

Sowing the seed too late in the fall to germinate until the following spring is preferable to summer sowing. On hills and in places where the ground washes badly, during the winter season, the results will not be as satisfactory as early spring sowing, as many of the seed are washed away during the winter and spring. We have also been successful in growing good fields of alfalfa by sowing the seed in March when the ground is frozen and porous on account of the action of the frost. This also has the disadvantage of seed being washed away by the spring rains.

THE BEST SEASON OF THE YEAR FOR SOWING SWEET CLOVER.

The habits and growth of the sweet clover plant resembles the alfalfa so closely that the rules applied to sowing alfalfa seed may also be used to good advantage in sowing sweet clover seed.

When the unhulled seed are sown, late fall and very early spring seeding has some advantages. The hull on sweet clover resists moisture and the seed is naturally slower than alfalfa in germinating. If sown in the fall or before the frost is out of the ground in the spring, nearly all of the seed will germinate the first year. If sown late in the spring only a portion of the seed will germinate and some of it will remain in the ground until the following spring before it will grow. When one wishes to raise sweet clover permanently it is an advantage to have some of the seed come up the second

year after sowing. It is a biennial plant and to make a field permanent, young plants should start to grow two years in succession. If it is not cut too closely there will be branches nearer the ground that will produce seed each year sufficient to reseed the field.

SELECTING THE FIELD FOR ALFALFA.

My best fields of alfalfa are on the poorest ground. Some of it very hard and stony, in fact, after the ground has been plowed and harrowed there are places where one could hardly see how it is possible for the alfalfa plants to come to the surface on account of the numerous stone. These fields were first selected because those who formerly owned the farms were not successful in growing anything on them.

Alfalfa is more easily grown, however, on flat land than on the hills although some of our best fields are on the top of hills five hundred feet above the valley, which is not more than half a mile distant.

It is not best to try growing alfalfa on fields having less than three feet of soil that the roots can penetrate. If there is stone or hardpan nearer the surface sweet clover is preferable to alfalfa. It is also better to use on fields where the water is within two feet of the surface, two or three months at a time. We have had successful fields of alfalfa where the water has covered portions of them for a week at a time, during the spring and fall months. The drier fields, however, will hold a good seeding longer and should be selected.

When the alfalfa is to be made into hay, the fields at the greatest distance from the barns can be used to the best advantage. When one wishes to cut the alfalfa nearly every day in the summer to feed green it is an advantage to have the fields close to the barn where it can be gathered with but little difficulty. Driv-

ing a long distance every day to the extreme end of the farm to cut alfalfa for feeding is expensive and not the best practice, any plan that will save labor will also increase the profits.

ALFALFA ON CLAY SOIL.

Alfalfa will grow to perfection on clay soil and during a very dry season it is more productive than when



Some of our fields on the highest hills. The one in the foreground is now covered with a luxuriant growth of alfalfa.

grown on sand or gravel. There has been much difficulty in keeping it through the winter on land that heaves with the frost and before our discoveries in growing the bacteria we lost several large fields some of them after going through one winter.

When the bacteria is not present in sufficient quantity there is a tendency for the plants to put forth all of their energy in growing one long straight root to find the nourishment it requires. When there is an abundance of rapidly multiplying bacteria near the sur-

face there will be many branch roots running out from the surface soil in horizontal lines. With the most favorable conditions these branch roots are often nearly as large as the main tap root, and with an abundance of these branch roots there is never any difficulty in wintering alfalfa successfully on the hard clay soil that heaves with the frost. This is because of the size and strength of the branch roots. When the ground heaves the plant and all of the roots are lifted and when the frost is drawn out in the spring and the ground settles the stronger branch roots carry the plant back in its former position. When grown with insufficient inoculation the branch roots are not much larger than a thread, and when these plants are lifted with the frost there is nothing to draw them back in position and when left standing several inches above the surface with all of the finer branch roots stripped from the main root, there is nothing left to start the plants into growth. The hard frost and cold winds during the early spring take the moisture and vitality from the plant and there is nothing left to grow.

In adjoining fields, where one was prepared with the bacteria culture and the other with common inoculated soil, all of the plants were winter killed in one field on a straight line and within a foot of plants that were not injured in the least where the bacteria culture had been used.

In addition to the benefit derived from using the culture on clay soil to prevent the plants from being winter killed it also adds to the productiveness and where it has been liberally applied the yield has been fully twice the amount of that which was produced on fields that had received only the inoculation.

SELECTING THE FIELD FOR SWEET CLOVER.

Sweet clover can be grown successfully and profitably on steep hills and stony places that could not be plowed, also in many waste places that could not be used for any other purpose. I would never use it, however, on ground where alfalfa can be grown successfully unless to fit fields that are too hard and barren to raise alfalfa without too much expense in preparation.



Sweet clover five feet high grown on our poorest land with a small application of alfalfa bacteria culture.

Where sweet clover is once grown, even on steep, side hills and stone piles alfalfa can afterwards be grown without even plowing the ground. It is only necessary to harrow the seed in at the most desirable season of the year and the alfalfa will grow quickly because of the deposit of humus and bacteria from the sweet clover plant. Alfalfa is better where it can be grown as it has two per cent. more protein and will often stay in the ground without reseeding five to ten years and where

the conditions are most favorable it has been grown fifty years on a field without reseeding.

LIME NOT ALWAYS NECESSARY.

Both alfalfa and sweet clover can be successfully grown on nearly all kinds of soil without the application of lime, although in a great many fields lime is a help in starting the plant the first season. After a plant is well established it sweetens the soil and renders it in the best possible condition for growing other farm crops.

A test can easily be made in the corner of each field where alfalfa is to be grown. These tests should be made a year in advance of the time of sowing the seed. A little place, a few feet square along the fence or in a corner of the field can be fitted by hand with a spading fork and rake. Half of the trial ground should be carefully limed, inoculated and seeded, the other half inoculated and seeded without lime. It is best to stake the test plots so that there will not be any mistake as to the final results. By making these field tests you will often discover that alfalfa and sweet clover make excellent growth on soil that has every indication of being sour.

A great many carloads of lime have been used on our farm and nearly all kinds that are being manufactured including burned, hydrated and raw ground rock. We are still using some of the ground rock on some of our fields and consider it more valuable than any other kind of lime. It is also used in our stables and helps to keep them in much better condition because it holds down small particles of dust and dirt that circulate in the air. After the stables have been cleaned a liberal quantity of lime is placed on the floor and swept into every crack and crevice so that everything is completely covered.

TESTING SOIL.

It is a good plan to take soil from several fields and fill small flower pots with it. Five or six small pots of soil from each field can be used to advantage in making tests each one being numbered or marked in a way to tell the field from which the soil was taken and also to distinguish one test from another. Each one of the samples should be given a little different treatment, one of them can be used just as the soil is taken from the ground without anything being added, another with a



This illustration shows four three-inch jars where a test was made, using soil from a field too poor and hard to grow alfalfa successfully without special treatment. No. 5 was filled with soil just as taken from the field. No. 6 had an application of inoculated soil. No. 7 had the inoculated soil and raw ground lime rock, and No. 8 had the alfalfa bacteria culture. The seeds were all planted the same day. The illustration plainly shows the advantage of using the bacteria culture.

little inoculated dirt and others with lime, humus and different kinds of fertilizer that is produced on the farm and available for use. When three inch pots are used a half teaspoon of the different things is sufficient to make a good test. After the material and soil is thoroughly mixed plant a half dozen seed in each of the

samples just a little below the surface, keep the soil moistened but not too wet. In this way one can easily tell the fields best adapted to alfalfa and those where it can be grown with the least difficulty. It will also show conclusively how to treat the soil to get the quickest and best results. As the plan referred to for the application of bacteria culture will bring good results on practically all kinds of soil it is often possible to get even better results by making thorough tests as above described. It is surprising to see how quickly the plants in certain pots will grow and develop in advance of others. One can see at a glance how certain elements, or combination of them, improves the natural conditions for growing alfalfa. There are many, no doubt, who will think this work is trifling and not of sufficient importance to warrant the time and labor required. In my experience it is these little things we do that give us a greater knowledge of our work and better fits us to make the business we undertake a success.

INOCULATING BACTERIA.

It is believed that there is much yet to be learned about the growth and development of bacteria that is essential in growing many kinds of farm crops. Because of this lack of knowledge of its life, growth and development many people have failed in growing alfalfa. Bacteria like farm crops requires special treatment to develop perfectly. In addition to having the soil moist and cold, it is always an advantage to have quantities of humus to retain the moisture as the ground becomes dry. There is nothing better for furnishing ideal conditions for hard ground than some forms of peat muck after having been exposed to the air for at least a year before using. It has been generally known that to grow alfalfa successfully there must be the bacteria and it has

been taken for granted that if the ground has once been inoculated with the bacteria in some form, other conditions being favorable for the seed the alfalfa will grow.

Repeated experiments have plainly shown that to get the best results in growing alfalfa the conditions first must be made favorable for the growth and development of the bacteria. This, no doubt, is the reason why so many growers recommend the selection of the fields in the best condition. When a field is in condition for growing a good farm crop, it is also in condition to encourage the growth and development of the bacteria. To build up the poorest soil it is only necessary to make the conditions favorable for the growth of the bacteria and the alfalfa will be a success.

On barren land and soil without any humus content, deficient in nitrogen the bacteria will not develop and increase neither will it live in this kind of soil long enough to become attached to the alfalfa plant to furnish it the required nourishment. This, no doubt, is the reason for failures in securing proper inoculation by using the liquid cultures. When these are used on poor soil there is nothing to support the life or encourage the growth until the alfalfa plant is started.

By using inoculated soil from fields rich in humus, the bacteria is not only transferred to the new field where alfalfa is to be grown but it also carries with it some of the necessary elements for the propagation and growth of the bacteria. To get the best results in growing alfalfa on barren fields it is necessary to furnish the bacteria in very large quantities and also to provide the necessary elements to encourage its growth until the alfalfa is well established.

When alfalfa, sweet clover and other nitrogen gathering plants fail to grow as they should it is because of poor or insufficient inoculation. The germs are so

easily destroyed that it is almost impossible to distribute them in the soil, during the summer months without their being killed. They live, grow and develop more rapidly in cool, moist ground than when it is too dry and warm.

The bacteria derive much sustenance from humus in the soil and are considered dormant below 42 degrees F., but when ample moisture and humus are available their activity is stimulated in proportion to the increase of air temperature until it reaches about 70 degrees.

GROWING THE BACTERIA FOR INOCULATION.

My plan of growing the culture for inoculating the soil is probably of the greatest importance. Liquid culture for inoculation and also soil taken from an alfalfa field will often produce good stands of alfalfa on land filled with humus and other fertilizing elements when seeded after the land is in the highest state of cultivation. Soil of this kind can be used to better advantage, however, for other purposes.

To get the greatest value from growing alfalfa the fields where the soil is poorest, (not good enough for growing other farm crops) should be selected and to make a success of growing alfalfa on the poorer land there are many advantages in growing the bacteria in advance of the time when the field is to be seeded.

After repeated experiments I have discovered a plan for growing the bacteria in a way to produce as much material in a square foot of ground for inoculating a field as will be found in a hundred square feet of soil taken from an alfalfa field. In addition to this, the bacteria is in a thrifty condition, multiplying rapidly and carries with it the necessary elements to favor its growth until the alfalfa has been thoroughly established, even though, there may not be anything in the soil to support its life. By this process I have grown the finest

fields of alfalfa on land practically barren too poor in fact for weeds to grow more than a few inches high and these fields are now producing from \$60.00 to \$100.00 worth of alfalfa hay per acre. This bacteria can be grown on your own farm by following the instructions hereinafter contained.

On account of our large farms and extensive experiments we have constructed special machinery to make the material for growing alfalfa bacteria, and find that by using the machinery the cost of making it ready to use is only about one-quarter the cost of making it by hand as we did in former years while the experiments were being made.

By using the machinery referred to, the material is made finer, runs through the fertilizer attachment to a grain drill with less difficulty and gives a better stand of alfalfa. One who owns an ordinary size farm would not require the special machinery if there is plenty of time during the winter months to prepare all the necessary material by hand.

If there is a shed, or building, available where the material can be kept dry it can be used to good advantage. If one has a good peat, muck bed or can get a load from a nearby neighbor it will pay to use it. In addition to this, use any stable manure that is available and the fertilizer from a hen house can be used to better advantage than on any other crop. It contains large quantities of nitrogen and is better to start the growth of alfalfa than any other fertilizer. The amount of each of the ingredients used is not of the greatest importance although we have found that about equal quantities of all the things mentioned gives us the best results.

Make a pile consisting of nearly everything available in this line so there will be about five or six hundred pounds for every acre of alfalfa seed you wish to

sow. A few hundred pounds of raw ground lime rock mixed with the material can be used to good advantage especially in helping to prepare the mixture so that it can be easily applied with the drill. This mixture should be turned every week or two until it has been turned ten or a dozen times. When the weather is warm it may be necessary to turn it more often to prevent excessive heating, as this would cause it to lose elements that are of the greatest value. When the pile is thoroughly mixed and decomposed, it should be run through a screen to take out all the lumps that would not go through the drill. The preparation of this material is the most important work in connection with growing alfalfa and one can well afford to watch the process carefully to see that it does not overheat. After this has been done thoroughly, prepare and mix it with an equal part of soil taken from an alfalfa or sweet clover field. It is important to get the dirt from a portion of the field where the alfalfa is thick and makes a rank growth. The soil should be run through a screen to make it fine and ready to use.

Spread all of this material out-of-doors on the ground so that it will be eight to ten inches deep. If there are some old boards handy, it is an advantage to make a box about the right size to hold the material, or even some stakes in the ground with some boards set against them to prevent the mixture from spreading. If there are stones, or any coarse material, on the ground it should be cleaned off thoroughly or the bottom covered with old boards so that when the material is taken out, it will be in the best condition for use. It should be packed until it is quite solid. Then rake the surface over with a garden rake until there is about an inch of the loose mixture on top. Sow alfalfa seed quite thick and rake it in. The seeding can be done any time until within about two months of the time when the

ground is likely to freeze. The alfalfa will grow very fast in this mixture and within two months of the time of sowing the seed, the bed will be completely filled with alfalfa roots extending to the bottom. This will start the rapid development of bacteria and within a very short time it will be completely filled and ready to use. This not only furnishes the necessary elements for growing the bacteria but it also provides nourishment for the plant until it can derive benefit from the nitrogen gathered by the action of the bacteria. When applied to the poorest land it will produce a strong, healthy growth of alfalfa that will make a permanent stand.

While it is possible to get a good stand of alfalfa in some of the best fields by only using the inoculating soil from an alfalfa field it certainly pays to use the material for growing the bacteria on the very best land as the increase in the amount of alfalfa produced will more than pay for the additional labor and expense.

SELECTING AND PURCHASING SEED.

There has been quite a lot written of late in regard to alfalfa seed and many of the growers claim that some varieties of seed are more hardy than others. In my own experience I have never found any difference. By following the advice and instructions in this book any variety of alfalfa used will produce good, hardy plants that will live through the winter and spring where the temperature often drops many degrees below zero.

It is important to have well developed, perfect seed, every one resembling a bean in its formation, which is necessary to produce thrifty plants. In most alfalfa seed there are many that have not properly developed and while they will often germinate the plant is not as strong and will not make a satisfactory growth. The next in importance is in being particular that there

is not any weed seed mixed with it. Before purchasing the seed it is an excellent plan to get a sample of the seed, count out one hundred of them and plant in a little soil. Count the plants and note their size and shape and you will then be able to judge accurately as to the germinating qualities of the seed offered for sale.

Farmers who expect to plant hundreds of acres will get better results by raising their own seed. While the seed can be produced on any field of alfalfa the second cutting generally being considered best, it is a better plan to sow the seed in drills, about two feet apart, using only about two quarts of seed to the acre, cultivating the rows thoroughly to keep a perfect mulch and prevent the growth of weeds. This method will grow more perfect seed and when considering the cost of alfalfa seed it will pay as well as any other farm crop.

SWEET CLOVER SEED.

For late fall and early spring sowing the unhulled seed are the most desirable and for late spring and summer sowing I would recommend the hulled seed as they germinate more quickly and will make a better growth the first season.

There are three kinds of sweet clover seed, the Yellow Annual, which I do not consider of any particular value, the Yellow Biennial, which is valuable although not equal to the White Biennial as this has large leaves, stronger plants and produces a great many more pounds of protein food to the acre.

The seed can be tested in the same way as the alfalfa seed is tested. It is easily grown and every farmer should raise their own seed. It would, no doubt, be an advantage to grow this seed in drills, although it would hardly pay as it is very productive and one plant will produce many thousand seed.

In harvesting the seed it is necessary that the plants be cut before the seed is fully matured. One must watch the seed crop carefully, and as soon as the lower racemes or spike-like branches of flowers are dry and mature it is best to commence harvesting.

The plants should be cut when the dew is on or just after a rain and before they have entirely dried out, as the ripe seeds are easily shaken from the stem.

The threshing can be accomplished by hand or with an ordinary threshing machine, although to hull the seed it is necessary to have a special machine for the purpose. We prefer the unhulled seed.

PREPARING THE LAND.

Only by thorough cultivation can one expect satisfactory results in growing alfalfa. A good quality of soil, however, does not require as much fitting as a poorer soil, except the land that is hard and packs like clay soil. The poorest hard land should always be plowed a season in advance of the time for sowing the seed. If a field where the sod is hard and stiff is selected it is important to thoroughly work the soil until the sod is entirely destroyed before seeding to alfalfa.

The poorest fields where there is but little growth with the possible exception of some very small weeds, should be plowed during the summer or fall and allowed to stand through the winter. Then harrow and roll until there is a very fine seed bed on the surface and the under portion packed solid. When the ground is not thoroughly packed the alfalfa plants will sometimes grow until the roots reach the bottom of the soil that was turned over. Unless this soil is nearly as firm as the subsoil there is difficulty in the root penetrating to a greater depth and the plant often turns yellow and dies.

Land that has been used for growing potatoes and kept comparatively free from weeds is in the very best condition to use for an alfalfa field the following year. It will not require plowing, and thorough harrowing, discing and rolling at the time of sowing the seed in the early spring will fit it perfectly for alfalfa. Fields that have been used for growing corn and other cultivated crops and also those used for grain should always be re-plowed. It is important, however, to plow the land at least three months before the time for sowing the seed unless one has a very heavy roller and is willing to do about twice as much work as would be necessary to fit the fields that have been plowed in advance.

The preparation of the land and the material for inoculation are the two most important factors for success and when one is not sure that the land has been properly fitted it will always pay to do a little more work.

APPLYING THE BACTERIA AND MATERIAL TO GROW IT AND SOWING ALFALFA SEED.

One of the most important discoveries I have made is in the way of applying the inoculation and sowing the seed. By careful observation I have learned that on the very poorest soil alfalfa plants must receive help from some source almost immediately after the seed has sprouted. This is more especially so on worn out land where there is not any humus or nitrogen.

Experiments were made mixing the seed with the inoculation and sowing altogether through the fertilizer attachment of a grain drill and, in addition to this, about half of the seed was sown broadcast through the same machine and at the same time. After the plants were a few inches high it was not difficult to see the rows as the plants grown from the seed mixed with the bacteria

were twice as large as the plants between the drill marks, as these could not derive any benefit from the inoculation until the roots were long enough to reach it.

On good land, however, the difference would not be as noticeable during the earlier stages of the growth of the alfalfa although it could easily be seen the second year.

On some of our land that bakes and crusts over, we have experienced difficulty at times because of the drill placing the seed and inoculation deep in the ground even after having set the drill to run as shallow as possible. We have had some trouble where a liberal amount of lime was used in the mixture as this would form a kind of a mortar and after becoming thoroughly wet would harden down so that the alfalfa plants could not get to the surface. A few fields have been lost in this way. The deep seeding is preferable especially on poor land, if one was sure that there would not be any rain until after the plants had commenced to grow. There would not be any difficulty on this question only on hard land that has a tendency to pack.

The seed could be sown in sand and gravel without the least danger of the plants being unable to break through to the surface, and it is not nearly so difficult to get a good stand of alfalfa on this kind of land as on the hard, clay soil, although it does equally as well when once established on the heavier land.

We have tried broadcasting the inoculation and even though it has been followed immediately with a harrow, the action of the sun on the drier surface of the cultivated soil did not furnish the desirable conditions that are had when the bacteria is placed under the surface and covered up by the drill. When there will be plenty of time to do the work on a field all in one day it is better to go over it twice, drilling half the material

at first and crossing it with the other half. When drilling the land over twice in this way, broadcasting is not necessary. This makes a more even stand covering the ground better which prevents the growth of weeds.

Because of not knowing the life and habits of the alfalfa plant when I first commenced farming, several hundred bushels of alfalfa seed have been lost before discovering the reason for losing it. I did not think it possible that the sun would kill the young plants



Spring wheat used as a nurse crop with alfalfa. One bushel of seed was sown to the acre and a yield of 25 bushels was harvested. The dark line shows the growth of alfalfa nearly half as tall as the wheat.

as soon as they commenced to grow. After conducting the most careful experiments it was not difficult to see that all of the alfalfa seed had been lost because of sowing it near the surface and at a time of year when both the soil and the sun were extremely warm. After making these discoveries and sowing the seed mixed with the inoculated soil we have never had a loss on account of

burning the young plants, even though some of the fields were sown during the warmest part of the year.

If it is necessary to sow both inoculation and seed by hand on some small farms, the work should be done very early in the spring. If for any reason one desires to start a field later, the only safe way would be to do the work when the ground is thoroughly saturated with water and after the sun is down at night, or possibly during a cloudy day so that there would not be any danger of losing the bacteria on account of its being exposed to the direct rays of the sun. After sowing it should be thoroughly harrowed in. If there is a tendency for the soil to pack it is better not to roll the land. On light sand or gravel it is often advisable to roll the field after drilling and also after broadcasting and harrowing it in. On hard, stony land it is better not to roll until early the following spring when the ground is very soft that the stones may be pressed into the soil to leave the field in the best condition for mowing.

When taking into consideration the fact that the alfalfa field is cut from fifteen to fifty times before re-seeding, one can readily see the importance of being thorough in the work, not only to make a perfect stand of alfalfa but also to prepare the field for easy harvesting.

When sowing alfalfa for the purpose of raising the seed a grain drill with seeder attachment can be used by closing some of the openings. Most drills can be arranged to sow three rows at a time, twenty-four to twenty-eight inches apart. This will permit of thorough cultivation and the alfalfa will grow twice as fast as when sown broadcast and not cultivated. Two quarts of seed to the acre is ample for fitting a field to raise seed.

On land rich enough to grow a good crop of corn and potatoes eight quarts of good alfalfa seed will make

plants enough for a perfect stand. On very poor land it is better to use half a bushel of seed to the acre. If the seed all germinate the plants will be very thick. The stronger ones will crowd out and smother the weaker ones leaving only those that are thrifty and that will withstand the necessary hardships that they may be subjected to.

When poor ground that is deficient in humus is completely covered with plants it helps to conserve the moisture which would be lost on a thinly covered field by evaporation. Porous soil filled with humus retains moisture like a sponge and the plants will grow to perfection even though the ground may not be entirely covered with them.

SOWING SWEET CLOVER SEED.

The advice given for sowing alfalfa seed can also be used for sweet clover. When the seed are to be sown on stone piles, brush lots and land that could not be cultivated the seed should be sown early in the spring when the ground is honeycombed by the action of the frost and the inoculated soil sown with it.

CARE OF ALFALFA AND SWEET CLOVER PLANTS

When the plants are a good, healthy green color and the weeds are not larger than the plants, there is nothing to do but to just let them grow. During a dry time and on land deficient in humus and nitrogen there will be a tendency for the leaves to turn yellow. This is an indication that the roots are not taking in enough nourishment to support the top and the plants should be cut at once. This cutting also encourages root growth and when the new sprouts commence to grow they will have a rich, dark green color. If not a healthy color they should receive an application of about 100 pounds of nitrate of soda to the acre. During times of excessive

rainfall for two or three weeks, the leaves will often have the appearance of being blighted. They are covered with little dark colored spots and it is seldom noticed until the plants are six inches to a foot high and it generally shows on soil that is very dense and because it is covered with water so much of the time that the oxygen from the air is prevented from getting into the soil when certain conditions of heat will start leaf blight. The only remedy is to cut it and the new growth will soon appear in perfect condition.

HARVESTING THE ALFALFA.

The alfalfa can be cut without injury to the plants any time after it is four to six inches tall. To get the most valuable food from a field of alfalfa it should be mowed just before the blossom buds begin to form. After the buds are well established the lower leaves of the plants will begin to drop off and as there is more nutriment in the leaves than in the stems it is important to save them all. Either green alfalfa or hay cut before budding will produce 20 per cent. more milk than the alfalfa that is allowed to bud and blossom. This has been proved many times in our own dairy.

When harvested at a time to make the best hay it is also more difficult to cure. We have harvested several hundred tons this year that is now in the barns in good condition and it rained nearly every day while doing the work. It is not as easily injured as the clovers and can be successfully cured in very stormy weather. We generally do our mowing one day, rake the alfalfa and cock it the second day and when the weather is good it may not be disturbed for two days when it will be ready to draw into the barn. This is four days from the time of cutting. If the weather is stormy the second day after cutting it is not raked until the following day. Should it rain hard enough to wet the cocks through

they are thrown open, rain or shine, and it is only necessary then to have a few hours without rain before you can commence drawing it in. If left in the cocks after a hard rain the hay will mould quickly. We have harvested several fields this year when we could only draw in two or three loads during the day and some days not any.

Many people recommend canvas tops to keep the cocks dry. It would be impossible for us to use them on account of the additional labor and expense and there



The third cutting of alfalfa thirty days after harvesting the second crop. This field has yielded three crops of alfalfa per year for five years.

is also a greater tendency for the alfalfa to mould because of the heating process and the retention of the heat. After drawing to the barn there is a tendency to keep on heating which is not detrimental to the quality. By cutting the alfalfa when it is very young the stems will be finer and it will pack in the barn until the lower portion will become nearly as solid as baled hay. A

barn will hold two or three times more alfalfa cut before it commences to bud than it will if not cut until after the blossoms have formed and, I think, two pounds of the former is worth as much as three pounds of the alfalfa that is not cut until after it is allowed to blossom. By cutting when the plants are young we can harvest four crops every season here in New York State where only three are harvested when the alfalfa is allowed to mature.

In making alfalfa hay for poultry it is better to cut it when it is only twelve to fifteen inches high. The leaves and stems are more tender and contain a larger per cent. of protein than we get from the older plants. In curing the alfalfa for poultry it is drawn in soon after cutting and spread about a foot thick on the floor in a room where it is possible to furnish ventilation by opening the windows. It is only necessary to turn this once or twice when it is gradually piled thicker to prevent bleaching. After curing it is nearly as green as at the time of cutting.

HARVESTING SWEET CLOVER.

Sweet clover can be harvested the same as we harvest alfalfa. It is more important, however, to do the mowing while the plants are very young as the sweet clover stems are larger and if allowed to grow full size have a tendency to become woody and undesirable for stock food. If cut when the plants are from eighteen inches to two feet high, the quality of the hay is nearly equal to alfalfa.

Care should be taken to cut the stubble of the preceding hay crops about six inches high so that there will be sufficient stems remaining to resume growth, as this plant, unlike alfalfa does not form new crown shoots.



Sweet clover on some of our poorest land. It is a little more than half grown and just the right size to cut for hay.

One cutting of this would yield at least three tons to the acre.

PASTURING ALFALFA FIELDS FOR MILK PRODUCTION.

If dairymen knew the value of alfalfa pasture for milk production they would all have fields enough to keep the cows supplied from spring until fall. To get the largest milk flow, the alfalfa should not be more than two-thirds to three-quarters grown. At this age it will produce a great deal more milk than when it is allowed to grow to maturity before turning the cows in. To provide an abundant continuous milk flow one should have as many acres as there are cows. Four fields of five acres each would keep twenty cows supplied continuously throughout the summer and with favorable weather there would be a surplus to harvest for hay. During the best growing season it will reach a height of eighteen to twenty inches in three weeks and I have had fields where the alfalfa was twenty-eight to thirty inches high and be-

ginning to blossom thirty days after the field crop had been cut over for hay.

We have cut the greater amount of alfalfa for hay and it is only recently that there has been a surplus for pasturing. Two or three different times during the present summer we turned twenty-four of our cows from good mixed pasture into an alfalfa field and in every case they increased fifty to sixty-five quarts of milk a day. This, of course, is without any grain. Had we made an effort, as in former years, to increase the yield of milk by feeding grain it would have been impossible to have made an increase of more than twenty quarts per day. After the cows begin to drop on their milk flow we turn them into another field and run the mowing machine over the field they have just been taken from so that within two or three weeks it will be ready to turn the cattle into again. The odds and ends that are left after pasturing can be cured for hay and are of more value for the production of milk than timothy and clover mixed. To build up poor land quickly it should be left on the ground but not thick enough to smother the alfalfa plants and prevent the new growth.

In selecting fields for pasturing, it is important to choose fields where the cows can have access to both shade and water. If neither are available, when you have alfalfa, it is better to pasture the cows at night and during the day keep them where they can have shade and water. When flies are troublesome cows will give more milk and keep in better condition if they are allowed to stay in the barn during the day time and supplied with green cut alfalfa. After milking at night turn them into an alfalfa field for pasturing until the following morning. Cows kept in this way will produce twice as much milk as when pastured on mixed grass and are being compelled to fight flies all through the summer months. Cows will

increase their flow of milk on alfalfa pasture, even though, it has been impossible to get an increase by other systems of feeding.

Pasturing Alfalfa Fields for Beef Cattle, Swine and Poultry

For the protection of the alfalfa fields and to promote a more rapid growth of the stock it is best to pasture them but a few weeks at a time the same as referred to for the production of milk.



Some of the Guernseys in a field of mixed pasture.

Judging from my own experience it is believed that alfalfa pasture will make more beef and better beef than any other pasture system of feeding and the cattle that have an abundant supply can be fitted for market in prime condition without grain or any other feed when the alfalfa is pastured at a time when the food elements are the most available. There is no better way to increase the size of stock than on alfalfa as soon as they are old

enough to eat it. We have registered Guernsey heifers that were kept on the alfalfa diet from the time they were four weeks old that have matured into cows as large as Holsteins.

Growing pigs that have been fed on milk and grain will rapidly increase when turned into an alfalfa field. It is, in fact, surprising to see how rapidly they grow and how quickly they improve in physical condition. We purchased one lot of nine shoats last spring without seeing them and when they were delivered they were not any larger than a pig should be when two months old. It was plainly evident that they had been stunted by improper feeding or lack of food. We, at first, thought they were not worth bothering with but afterwards decided to run them in an alfalfa field with some other hogs and it was not long before they commenced to grow and after a month in the field they certainly look like another lot of shoats.

The field we used for pasturing the hogs was not a very good stand as it was one that had been seeded with liquid inoculation and we were not anxious about retaining the field in alfalfa without having a better stand, and for that reason left the hogs in continuously. There were three registered bulls and fifteen hogs in the field containing a little more than an acre and it has been necessary to mow the field once as the hogs and cattle did not eat the alfalfa as fast as it grew. The present indications are that this small field will give us a greater income with less labor than any other field on the farm. We have some very choice registered Yorkshire hogs and expect to keep several hundred next year.

While the hog and cattle business does not furnish as steady an income as one gets from a dairy it is believed that the net returns in a year will be even greater and with very much less work. One man can successfully

operate quite a large farm devoted to beef cattle and hog raising on alfalfa and it will be difficult to find a business that will yield an equal income when taking into consideration the amount of capital and labor it would be necessary to invest.

Poultry, geese, turkeys and ducks can also be kept largely on alfalfa pasture. When given an opportunity to range on alfalfa they will grow faster, lay more eggs and the young fowls will be stronger than when fed largely on grain. Half of the field that is used for pasture should be cut every two weeks. This promotes new growth and keeps them constantly supplied with the very best quality of food.

CUTTING ALFALFA TO FEED GREEN.

When there are not enough fields to use for pasturing, the alfalfa can be cut and fed green and in this way nearly twice as many head can be kept on an acre as when it is pastured. The results, however, are not nearly as satisfactory. Cows will increase 10 per cent. in milk production when taken from common pasture and fed all the green cut alfalfa they will eat, and by turning them into the same field where the alfalfa is taken from will increase fully 10 per cent. more. This, no doubt, is because when feeding the alfalfa in the stables, after it has been cut, they eat everything, leaves, stems and all. When pasturing in a field they eat only the leaves and the tender portion of the stem, giving them a larger percentage of milk producing food than they get when eating stems and all. We have tried several times changing them from green cut alfalfa to mixed grains and clover and they always drop about 20 per cent. in milk production. We have also tried green cut barley, wheat and oats with the clover which failed to produce as much milk as the cows gave when they had nothing but alfalfa that had been cut before maturing.

FEEDING ALFALFA HAY.

There is, of course, as much difference in the quality of alfalfa hay because of the time when it is cut, as there is between feeding the green alfalfa while it is tender or feeding it when it is grown to maturity. Alfalfa hay fed to cows, horses and hogs, in addition to a few small potatoes, carrots or mangels will keep the stock in better condition than when fed on mixed hay, grain and ensilage.



Note the condition of the four year old registered Guernsey in the foreground. She was raised and has been kept almost entirely on alfalfa and at the time the photograph was taken she had been without grain for eighteen months.

For several years we used about eighty acres of our best land for growing ensilage corn. The acreage is being decreased each season as our supply of alfalfa increases and we are using it with the small potatoes and carrots in place of ensilage. By using our best ground for potatoes we can make a good profit from the sale of the large ones and the small ones are left for feeding the

stock. After making the most careful experiments in feeding corn ensilage and grain to our dairy we found that it was not possible to make a profit even though the milk was being sold at retail. The farmers who sell milk at wholesale, using their best land for growing corn ensilage and buying large quantities of grain for feeding their cows, will find it a difficult task to increase their bank account on this system of farming, especially where it is necessary to employ all of the labor in handling the farm work. The best quality of alfalfa hay for winter feeding and plenty of alfalfa pasture for summer, will soon make any dairyman financially independent.

GROWING ALFALFA WITH NITRATE OF SODA.

Alfalfa can be grown on the poorest soil, even in pure, white sand by thorough inoculation and by supplying the young plants with nitrate of soda. This, however, is a more expensive process than to make the material for the production and growth of the bacteria.

When growing alfalfa with nitrate of soda about one hundred pounds should be used with the inoculated soil when sowing the seed. On the very poorest soil it will require an application of about one hundred pounds to the acre each week for about four weeks. This is best applied by dissolving in water and sprinkling it on. The machines for spraying potatoes can be used to good advantage or it can be sown broadcast without being dissolved. This nitrate supplies the nitrogen for the growth of bacteria and to help the young alfalfa plants until they are thoroughly established and have sufficient strength to draw their nitrogen from the air.

When one is extremely anxious to force a field of alfalfa or when a field is beginning to turn yellow because of insufficient food, a light application of nitrate of soda is a great benefit. We have never used it, however, in a large way because we can get just as good

results at a lower cost by using a liberal quantity of the material referred to that is used for growing the bacteria.

FARMING WITH AND WITHOUT ALFALFA.

After farming many years both with and without alfalfa I am in a position to know the advantages one has in growing it. While I am greatly interested in seeing everything grow and enjoy farm life especially, I would not care to continue the work without alfalfa. It would be extremely difficult to describe all the advantages of farming with alfalfa and it seems necessary that one should try both ways before fully understanding its value. In my experience the difference is as great as the difference between profit and loss.

I have been successful in improving the soil by the old methods but the process was so slow that it would require more than one's lifetime to see all the fields productive on a poor farm. After paying all expenses the only profits derived from the work were used in an attempt to build up the quality of the soil. This refers to farms that have been practically exhausted before they were purchased.

We had other farms, however, that gave us a fair profit by the old method of farming although the net income was not sufficient to make the work interesting. It is believed that one-fourth of the land that has been used for farming without alfalfa can be made to produce a larger income by growing it either for the dairy, beef cattle, swine, poultry or all of them combined. In speaking of farming with alfalfa it is referred to as the principal crop and soil improver.

Of course, nearly everyone knows that diversified farming has many advantages over specialty work and while the foundation of the farm and farm profits are

built upon alfalfa, the larger portion of the income is derived from other sources as the land is better fitted for growing potatoes, beans and other crops that will sell to the best advantage in local markets; and the income per acre for such crops will often furnish greater profits than are had from either the dairy or stock raising alone, although the risk is greater. The weather conditions have so much to do with cultivated crops that when planting the seed one has no assurance that a profitable crop will be raised. Of course, we all understand that there is land in almost perfect condition, properly drained and irrigated, so that one is practically sure of success. This, however, is the exception and not the rule, and I doubt, if there is one acre in a hundred thousand where almost perfect conditions can be artificially made at times when there is too much or too little rain.

Dairying, stock raising and poultry keeping can be made successful regardless of weather conditions. If the work is properly done there is not one chance in a thousand of failure. Alfalfa is about the only crop that I have raised that will thrive under all sorts of unfavorable conditions. When there is just enough moisture and the temperature is the most desirable, alfalfa will of course make more rapid growth than at times when it is too wet, too dry, too cold or too warm, although even during such times it will keep on growing and will produce more than twice the amount of stock food that one is likely to raise by planting other farm crops. When there is an abundant supply of alfalfa there is always milk, butter, beef, poultry, eggs, etc., to sell regardless of weather conditions. The farmer who conducts his work along this line will always have good credit at the bank because they always have something to sell to bring in the ready cash, and those who make a specialty of one or more crops, such as growing onions, potatoes, tomatoes, etc., sometimes make very large profits and many times do not

realize enough to pay transportation charges on the produce raised and shipped. These things are all perishable and unless they reach the market when they sell at a fair price the results are often discouraging. The fluctuation in the market price of milk, butter, beef, poultry and eggs is not as great and there is always a good market at a price that will pay the grower a profit.

People who are energetic, enjoy general farm work and get pleasure from seeing things grow will find the diversified farming, as above referred to, the most satisfactory and profitable. If one wishes an easy living from a poor farm there is no better way than to seed it all to alfalfa and sell the hay. This is about the only kind of farming that can be practiced when selling the entire crop without exhausting the soil. The longer alfalfa is grown on land, even after all of the hay is sold, the better the land will be. When farming for alfalfa hay only, there is nothing to do but to harvest, sell the crop and pocket the money, after all of the fields have once been seeded. This is, no doubt, the most desirable way for people to farm who are well along in years and also for those who can do but little of the actual farm work. When the alfalfa is once thoroughly established it will bring in a steady, continuous annual income of a greater amount than the value of the average farm land.

ALFALFA COMPARED WITH RED CLOVER.

One hundred bushels of red clover seed was the first purchase made after buying a large farm. This red clover was sown in oat, rye and wheat fields at the rate of half a bushel per acre. On most of the fields we had a good stand of red clover and on the fields where the conditions were favorable the red clover grew and produced abundantly, furnishing a lot of good pasture the first fall and giving us two cuttings of hay the following year.

The third year it was plowed under and planted to corn and the results were quite satisfactory. The larger portion of the fields, however, did not have sufficient humus in the soil to make the clover grow properly and the seed on all of this land was practically wasted.

A nearby field that was almost as barren and hard as the road, in fact, too poor for either oats or red clover, was thoroughly fitted and sown to alfalfa after having been inoculated and receiving an application of litter from the poultry coops. It was the humus and nitrate in this litter that saved the crop and helped to support the life of the bacteria. We are still cutting the field three or four times every year while the surrounding fields of better land, sown to red clover have been plowed two or three times and the crops harvested have not been worth half as much as the alfalfa hay produced on the poorest field which did not have any cultivation or seeding except the first time, and while the red clover seed cost as much per bushel as the alfalfa seed, it only produced about half as much hay the second year as we had from the alfalfa field and it was not worth more than half as much to feed. One reason for there being so much difference in the value of the hay is because of the difficulty in curing the red clover, especially where there is a heavy stand, and unless it is properly cured its value is not equal to alfalfa that has been harvested under the same unfavorable conditions.

Red clover used in a short rotation and plowed under every three or four years will add humus to the soil more quickly than alfalfa. It will also render the soil in a more productive condition and in a shorter space of time. On land where red clover can be successfully grown and on fields that will be used for cultivated crops later, it can be sown to advantage, although it is believed that sweet clover will build up the land as quickly and at the same time fit it perfectly for alfalfa. The roots of sweet

clover are of a pulpy nature, decompose quickly and furnish large quantities of fertilizing elements in a very short time after it is plowed under. Alfalfa while slower in improving the soil does the work more thoroughly bringing up larger quantities of mineral elements from a greater depth than the roots of other plants grow. The alfalfa roots are wedgeshape, large at the top and small at the bottom. Plants three years old will often have roots six to eight feet long, the first foot of the root below the surface has a greater weight than the other six or seven feet combined, because of this a large portion of the fertilizing elements are stored near the surface. It also has the advantage of piercing dense subsoils making them porous for the reception of water and to assist in drainage. The roots are more of a fibrous nature, slower in decomposing and furnishes plant food several years after it has been plowed under.

Our cows have always produced fully 10 per cent. more milk on alfalfa than on red clover. All things being considered it is believed that one acre of alfalfa will produce a greater net income, five years in succession, than could be had from two acres of red clover, as the expense of plowing, fitting and reseeding must be taken from the gross income, when comparing it with a five year crop of alfalfa.

CATTLE, SWINE, SHEEP AND POULTRY.

As previously stated, cattle, swine, sheep and poultry properly kept on an alfalfa farm places one in position to get a good income with but very little risk. The branches of the stock industry that require the most labor also furnish the largest profits. If the labor is not to be considered, poultry on the farm will furnish a larger income for the investment than one is likely to get from any other source. Dairying may be considered next in line when there is a good market for the milk, cream and butter.

Hogs bring quick returns because they multiply rapidly and can be fed almost anything grown on the farm and things that cannot be used for any other purpose, although alfalfa will keep them in perfect condition even during the winter when it is necessary to feed alfalfa hay. Sheep and beef cattle can also be made profitable even on small farms where alfalfa is well established. It never pays to keep common or grade stock when one has sufficient funds to purchase registered stock. If there



These ducks were grown largely on alfalfa that is growing around the pond. The actual cost of grain given them would not exceed ten cents each.

is 50 per cent. profit in growing grades there would be fully a hundred per cent. profit in growing registered poultry, cattle, hogs, etc., when kept under the same conditions. We have been raising all of our Guernsey heifers for several years at a very small cost. If they were to be sold at public auction the profits realized from their sale would be greater than the total profits from the milk and butter. A good two year old Guernsey heifer, well bred and well grown is worth from

\$200.00 to \$500.00 and the market value of grades is about \$50.00. When one is selling butter or cream there is also a great advantage in keeping registered Guernseys not only because of the superior quality of their butter but also because the butter fat is produced at a lower cost. There is a greater difference, however, in registered hogs. We have young Yorkshires and yearling registered pigs that are fully twice as large as the grades at the same age.

I am not prepared to say a great deal from actual experience in growing sheep. One of our farm superintendents, however, has had a considerable experience in this work and we shall probably soon add some registered sheep to our farms as we have some land that cannot well be tilled and that can be used for growing sheep to good advantage.

FARM OPPORTUNITIES.

The opportunities for farming were never more promising than at the present time and those who enjoy out-of-door life will never regret the time of starting it by going cautiously and profiting by the things that have been learned about progressive agriculture.

Farming the old way with a feeling that the fertility is being taken from the land in excess of the amount replaced would be a most discouraging undertaking. It is the thought that we are enjoying our work, improving our methods, increasing the fertility of the soil and banking a snug income in excess of the actual cost of living that makes us all happy. One who does not enjoy farm work, the nature studies and the many things of interest on a farm would be unwise to even give the business a thought or any consideration.

It has generally been considered that farm work is a drudgery and that there is too much physical exercise

when considering the returns. This in my opinion is the individual and not the business. Any work can be made difficult and laborious if it is not handled intelligently. A good, clear mind connected with executive ability is of greater value on the farm than the strongest muscles. If manufacturing business generally were handled along the same loose methods that have been applied to the large majority of the farms there would not be one chance in a thousand for them to make the business profitable.

People with large resources and a general business training are becoming greatly interested in farms and farm work and while many of them make greater mistakes than the old line farmers there are also some of them who grasp the correct principles and forge ahead in a way that sets an example to others. It is the interest of this class of people that is responsible for creating a greater demand for farm land, which will eventually result in improved methods and will increase the price of farms. At the present writing it is believed that farms are now selling at the rock bottom price and that within a few years all land values will be sufficiently increased to make the purchase of a farm a good investment without taking into consideration the regular farm profits.

The best farms were the only ones that were of interest when first commencing farm work. After several years experience in nearly all kinds of soil I would consider a run down farm that could be built up and that would retain fertility a better investment than one in a high state of cultivation. If the good land has been well farmed holding it at its purchase value is about all one could expect to do without taking into consideration the prospective advance which is sure to come. The poorer farms can often be purchased at one-quarter the price asked for better land. By taking advantage of the

recent discoveries for improving poor soil it will only be a question of a few years before the poorer farms will have an equal, if not a greater value than the better ones, as the older methods employed in keeping up the fertility of the land have a tendency to draw excessively on the mineral elements and the newer methods restore these elements by the action of the deep rooted plants.

The perfection and low cost of automobiles is one of the principal factors in making farm life more attractive. With an inexpensive car one can reach town from a distance of five or six miles almost as quickly as the center of the city can be reached by trolley cars when living in the suburbs.

There is no other business where one can be so independent as on a farm and by close application the opportunities for financial success are greater than in most other business enterprises.

Farms can be purchased here in Chemung County at prices ranging from \$10.00 to \$100.00 per acre. Some of the best farms adjoining the city sell at higher prices. The farms that are offered at \$10.00 to \$25.00 per acre, generally consist of steep hills and fields not easily cultivated. A better side hill farm can be purchased at prices ranging from \$40.00 to \$60.00 per acre. All things being considered these side hill farms can be made of greater value and more productive than farms in the valleys that are now being offered for \$100.00 to \$200.00 per acre. Three years work along the lines suggested in this book will increase the value of any of the \$40.00 land to at least \$100.00 per acre. More of these farms will be added to our present holdings as rapidly as they can be given proper attention. It is believed that there are just as good opportunities in every other county of the state and also in all of the other states.

DAIRY AND STOCK FARMING.

A fifty acre farm with about twelve registered cows, fifty registered hogs and two to five hundred head of the best poultry would make an ideal proposition for the average farmer. There should be at least forty acres of tillable land, twenty acres into alfalfa and twenty acres for other farm crops. A farm of this kind could be handled perfectly with two men and two horses and should give one an annual net income of \$2,500.00 to \$3,000.00. By doing this work thoroughly taking advantage of everything available, three men and four horses should be able to handle twice the above number of cows, hogs and poultry and keep them in perfect condition on a fifty acre farm and everything to feed them could be raised with the exception of a portion of the grain for poultry, as on a small farm of this size it would not be profitable to undertake the work of raising it. To do the work just as it should be done on larger farms the number of men, horses, cattle, etc., should be increased proportionately, unless one wishes to raise cattle and hogs for market in place of keeping a dairy which will greatly reduce the amount of labor and the number of teams that should be kept.

FENCING, WATER, SHADE, ETC.

Good fences on farms where hogs and cattle are kept are of the greatest importance. Fences and fields arranged for convenience will save a great many steps in the course of a year, will be a great factor in the final outcome and will also save the loss and annoyance that often occurs when cattle break out of fields on account of the poor condition of the fences. On most farms it is seldom advisable to make all the fields of uniform size and follow perfectly straight lines, although there are many sections where this kind of division of fields can

be made without any objections. One of the things to have in mind is easy access to all fields without the necessity of going through one field to get to others. This can often be arranged by having long, narrow fields and it is really an advantage when cultivating or mowing as the work can be done without the necessity of so much turning around at the end of the rows.

Shade and water for pasture are also important factors in getting maximum results. Natural running streams are a great advantage and when these are not available small windmills would be the next choice. These small mills can often be installed for a smaller amount than would be required to carry water long distances in pipe.

A few, good shade trees would be found a great comfort to ranging cattle and when these are not in the fields there should be a temporary shed for their protection from storms, flies, etc. By hanging burlap loosely over the sides of the shed it will permit of good ventilation, will be a protection from storm and will also darken the enclosure keeping the flies from the cattle.

MAKING EVERYTHING COUNT FOR SUCCESS.

Nearly every farmer overlooks many things that could be made to assist greatly in improving the land and also in getting larger profits from the farm. I have seen people on our Florida farms, after burning up large piles of brush and stumps let the ashes go to waste by allowing the heavy rainstorms to wash them into the creeks and at the same time send money away to purchase fertilizer that was not nearly as good as the ashes they already had, and even after showing them that ashes and hen manure mixed together would make one of the very best fertilizers.

On small patches of potatoes where a very light application of this mixture was used, probably about

500 pounds to the acre, the potatoes yielded at the rate of 250 bushels while on other land where commercial fertilizer was used the yield was not nearly as good. Some of the people who saw these potatoes planted and harvested are still allowing their wood ashes and other things to go to waste that could be used for fertilizer.

The ashes made in a year from a common kitchen range when properly applied to a growing crop will often increase the production, almost enough to pay for the fuel. This is not to recommend that farmers should purchase wood ashes and is given only as an illustration to show how things of this kind can be saved and used to advantage.

On practically all kinds of land the fertilizing elements that are found in wood ashes can be taken from the subsoil and brought to the surface by the action of the roots of alfalfa. When surface soil is deficient of these elements for growing a good crop they can often be used to advantage and will hasten the process of building up the soil. If wood ashes are kept perfectly dry and retain all the potash, it is surprising to see what a large area a small quantity will cover by dropping in a hill so that the plants may get the full benefit.

The way manure is generally handled about twenty-five per cent. of the fertilizing elements is about all that is really utilized to improve the land and increase the production. It should either be distributed on sod land every day or saved in a way to retain more of the elements. It should be kept dry until ready to use, then to get the quickest returns it should be piled out-of-doors and turned or shoveled over several times to prevent excessive heating and to render it in the best condition to make all the fertilizing elements immediately available. It should then be dropped in hills, or drills, so that the plants may get the full benefit.

Raw manure broadcasted on land for cultivated

crops is largely wasted. When used in this way it should always be applied to meadows or on fields where the waste is not so great. The coarse litter and straw that is generally a large portion of the manure is of but very little value unless it is decomposed before it is used. There are a great many kinds of soil where the coarse manure plowed under or cultivated in will assist in loosening the soil, making it more porous and in better physical condition. It also helps in retaining moisture, although it is almost impossible to build up poor, hard land in this way unless more stock is kept than the farm will support and it certainly never pays to keep so many head of stock that the larger portion of the returns go to purchase material for their maintenance.

By taking advantage of the information herein contained in regard to growing sweet clover and alfalfa the poorest land may be improved until it will raise a perfect crop. The process, however, is a little slower in the beginning which is the reason for suggesting that everything available on the farm, that can be made to increase the fertility should be saved and applied in a way to get the greatest benefit. While large quantities of manure and fertilizer properly prepared and applied will bring the quickest returns it will take a great many more years to make a poor farm good than to build it up through the agencies of nitrogen gathering plants. When the fertilizer is once restored in this way and by continuing the same system that has been used in building up the farm there will be continuous improvement for all time to come.

CANNING.

Farmers who take advantage of every opportunity can save many dollars on their living expenses and at the same time have an abundant supply of better food than can be purchased from local markets.

There should always be an abundance of everything good to eat on the farm. During the summer months, a large portion of the food supply should be taken direct from the garden and in the winter there should be a supply of home canned goods of a better quality than can be purchased. When one is supplied with a simple, little machine for canning, a few canned goods can be put up nearly every day during the summer without adding greatly to the burdens or the work of those who prepare the meals. When preparing vegetables for the table such as corn, beans, peas, beets, tomatoes, etc., it is but little extra work to gather and



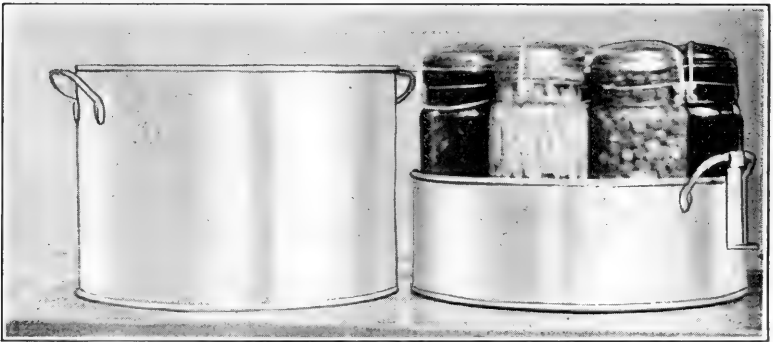
The Cycle Canner and eight cans of fruit and vegetables. A good way to help make a farm profitable.

prepare more than will actually be needed. All that has been left after the meals are over can be used to fill cans and the cans set in a little canner on the back of the stove, when the labor is practically over. These cans can be set away from day to day until there is a large supply of practically everything that has been used fresh from the garden and will be just as good several months, or even years, later as the day when it was prepared. This not only applies to vegetables but also includes all kinds of fruit and nearly everything that is good to eat.

During the fall and winter it will pay to fill the

empty cans with chicken, beef, fresh pork, sausage and other kinds of meat that can be preserved perfectly to use during the summer months, when fresh meat cannot be kept more than a day or two.

The money saved in this way and invested in fruit trees, alfalfa seed and other things for farm improvements will greatly assist in the final success. One never knows the satisfaction there is in having an abundant supply of everything good to eat at all times, until after they have had the experience. There is no excuse for one who owns or works a farm to be short of food for



The Canner is open showing the finished product.

the table and when they are it is always a case of mismanagement or lack of energy. It is surprising to see how many things one can raise on their land when properly interested and willing to work to see what can be accomplished. Those who work a farm are entitled to the best of everything to eat and by taking advantage of every opportunity there will always be an abundant supply.

MISTAKES.

It is believed that the greatest mistake made since commencing our farm work has been in plowing and

cultivating too much land at a time. In fact, more than we could cultivate perfectly and complete the work at the time it should be done. This is one place where it is not profitable to be too optimistic, expecting more of our men and teams than they are capable of doing. When the farm work once gets behind it is almost impossible to catch up so that the work can be done at a time when one day in the field will do more good than several days later. When we see many fields not pro-



The wheat was left out of the drill when making one trip across the field. The alfalfa is not any larger and the weeds are growing in place of wheat.

ducing as they should, there is always a great temptation to try and make them more productive and this, of course, is what we should do, if not undertaking so much that the fields cannot be thoroughly prepared.

Some of our fields have frequently been harrowed a dozen times before seeding and I am positive that in some cases twice the amount of harrowing would have given us enough better results to more than pay for the additional labor. When we take into considera-

tion that in fitting land for alfalfa it is only necessary to do the work once in many years we should feel that we could well afford to do many times the amount of work that would be necessary in preparing the field for a single crop.

Other mistakes have been made in raising crops that were not profitable and had we taken the time to figure the cost of preparing the land for certain crops and the value of the same after being harvested we would have realized our mistake. For several years we sowed a hundred acres of oats every spring. Had we given fifty acres an equal amount of tillage and sown wheat in place of oats we would have had twice the income, although wheat has never been very profitable on our farms as it is necessary to deduct the full amount of labor before there is anything left for profit. We are now making it profitable as the wheat is sown with alfalfa and the only additional cost is the price of the seed. Because of the thorough preparation the soil has for alfalfa the wheat is a great deal more productive. On fields where only a bushel of wheat was sown to the acre we have had an average yield of thirty bushels. We are inclined to think that the alfalfa grown with the wheat is partly responsible for the increased production as the alfalfa properly inoculated accumulates nitrogen that assists in the growth of the wheat.

Another mistake was made for several years in raising corn for ensilage on all of our best land. It requires good land to grow a good crop of corn for ensilage and it must have heavy applications of manure or fertilizer to keep the land up for its production year after year, and it is still a question whether it pays us to raise any corn for ensilage. By using some of our best land for potatoes, beets, carrots, etc., we can generally sell enough to give us a good profit and by using the balance to feed

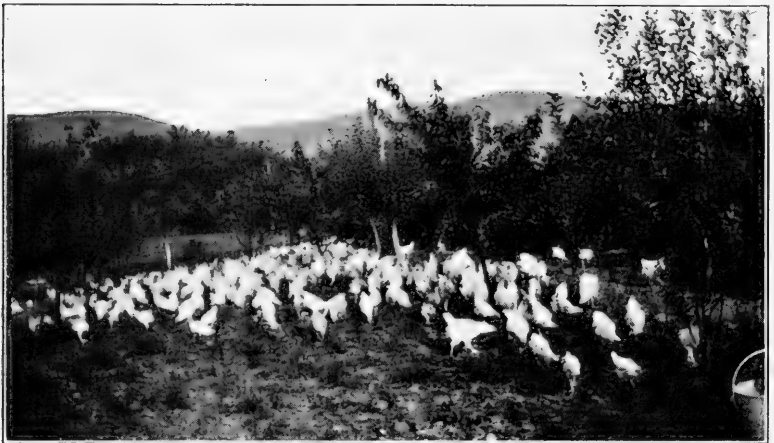
the stock we will get nearly as much food value as we have from the corn ensilage without realizing anything from it excepting that which we get from the cows and the other crops do not take nearly as much from the soil. On farms where alfalfa is not grown it may be necessary to make ensilage in order to keep up the milk supply. We shall continue the experiment along this line until we are fully satisfied as to the advisability of raising corn for ensilage.

There has been times when it would have paid us to employ more labor as the success of a cultivated crop depends largely upon the time when it is planted and also on the cultivation and treatment while it is growing. We had seventy acres of potatoes this year and on account of the excessive rainfall it was impossible to keep them all sprayed and properly cultivated with the help and machinery we had. If we had given forty acres an equal amount of spraying and cultivating we could have had as many potatoes as we will now get on the seventy acres. Some of the first fields that had the best care and also some of the last ones planted were growing at a time when they could have proper attention and this has resulted in twice the yield we had from the fields that could not be taken care of when the work should have been done. Thorough preparation, thorough cultivation and careful attention during the growing season is almost sure to result in perfect success.

It will probably be best to stop writing about our mistakes. If we were to continue this until we had covered them all there would not be room for much of anything else.

POULTRY.

Poultry on the farm should be one of the first things to consider. Even the poorest soil will support a large flock of poultry and provide an immediate income in addition to the fertilizer produced which is actually worth 25 per cent. of the cost of the food consumed by the hens for an average farm crop. For the production of alfalfa it is believed that the fertilizer produced by a hundred hens would add fully a hundred dollars to



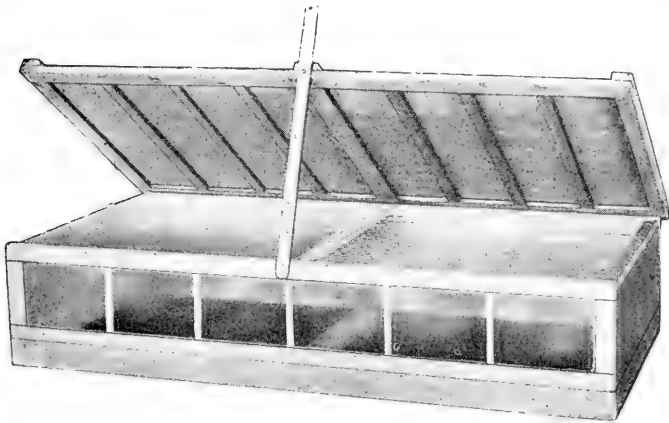
Some of a flock of 600 pullets that have access to alfalfa range.

the value of the alfalfa crop. The fertilizer produced from a hundred hens when properly prepared and applied will be enough to force a five acre field of alfalfa into rapid growth.

The smallest and poorest farm should support at least two hundred hens. When taking into consideration the several sources of profit, they can be made to furnish the farmers a net income of \$500.00 per year. The eggs are easily exchanged for cash and are pro-

duced largely at a season of the year when there is but little to furnish an income from other sources unless one is running a dairy farm.

Generally speaking poultry is neglected more than other things on the farm and the profit the average farmer derives from this source is not more than 25 per cent. of the amount that should be received. When poultry is kept as only one branch in a system of diversified farming the question of labor in caring for them should also be carefully considered. The laying hens and half grown chickens when handled in connection with other farm work, should not be confined to coops,



The Brooder Coops are easily made and unexcelled for raising chickens to broiler size.

houses or small runs. They should have freedom of the fields and fenced from the garden and all of the farm buildings also from the road when it is a main thoroughfare. By studying the condition and providing a coop so that it will be convenient for the attendant and away from other farm buildings it is not difficult to teach the poultry to range back into the fields where

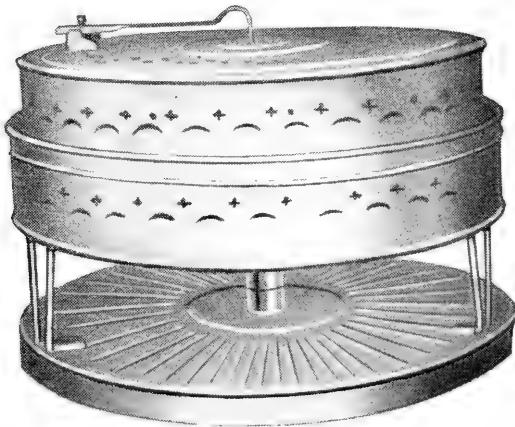
they can gather more than half of their food from early spring until late fall. An enclosure of an acre for two hundred hens should be provided so that the hens can be confined while fields of corn, grain and other farm crops are being started. After having a good, substantial start the poultry running through the fields will be a benefit as they will help to destroy a great many insects that injure farm crops. They should not be given their liberty while using poisonous sprays on potatoes, fruit trees, etc., although it is seldom necessary to confine them more than a week, and it is generally safe to let them out as soon as there is a heavy rain after applying the poison.

Two hundred laying hens can be kept on the farm at a cost not to exceed fifty cents per day. There should be a net income from the sale of eggs amounting to not less than \$2.00 per day, for at least two hundred and fifty days. There are not many farms where more than two hundred hens can be kept and not many farmers who will give the work enough attention to make a larger flock furnish as large a net income as would be derived from the above number. When increasing the flock beyond this number it takes one into the specialty business and requires greater knowledge, a larger investment and a great deal more labor to equal the returns from a smaller flock. When two hundred laying hens are kept there should be about five hundred chickens raised each season to replace the old hens, as the profits are 25 per cent. greater the first year of a hen's life than may be expected from her the second year. Cockerels should be sold for broilers and roasters just as soon as they are old enough and in fit condition for market and when the work is properly handled the income from this source should pay the cost of raising all of the chickens, including the pullets. Two hundred pullets can be selected to replace the old hens and the

annual sale of the hens can be placed to the credit of the poultry branch of the farm work.

To raise five hundred chickens at the smallest cost there should be an acre selected near the house for the brooder coops and enclosed with a five foot fence. Chickens should be confined in these coops until nearly feathered then allowed to range until about three months old when they can be placed outside of the brooder coop yard and have an unlimited range.

In these days of perfected incubators and brooders it never pays to set eggs under hens and allow the chickens to run with them. The chickens should be hatched in incubators and placed in Brooder Coops with heatless brooders in lots of about one hun-

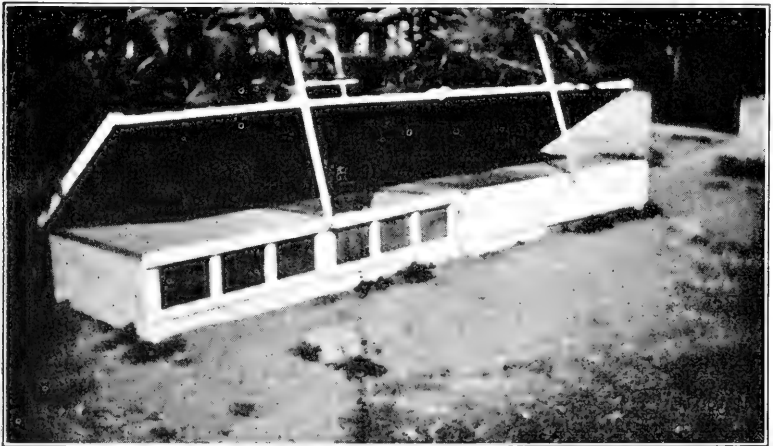


The small Hatchers can be used to advantage on nearly all farms, even where thousands of chickens are hatched annually.

dred. Four Cycle Hatchers and four Twin Brooder Coops with Brooders will make an ideal outfit for the farmer who wishes to raise five hundred chickens. With this equipment all of the chickens can be raised early in the spring coming to maturity in the early fall when eggs sell at the highest prices. One

of the men in our poultry yard has raised over three thousand chickens this summer in addition to running incubators and having the care of several hundred laying hens. These chickens were all hatched in Cycle Hatchers and raised in Twin Brooder Coops as shown in the illustration.

This system of brooding is one of our latest discoveries and by its use one man can handle twice as many chickens as can be handled by other systems



Twin Brooder Coops with hover in one and range for scratching in the other.

that have been in general use. We have never raised a larger percentage of the chickens hatched and have never had stronger and healthier young fowls than we have at the present time. It is better not to undertake the poultry work on the farm than attempt to raise chickens the way they are generally raised as the work would involve too much labor and the danger of the chickens being taken by rats, weasels, cats, hawks, etc., is too great to give one any assurance of success. By rais-

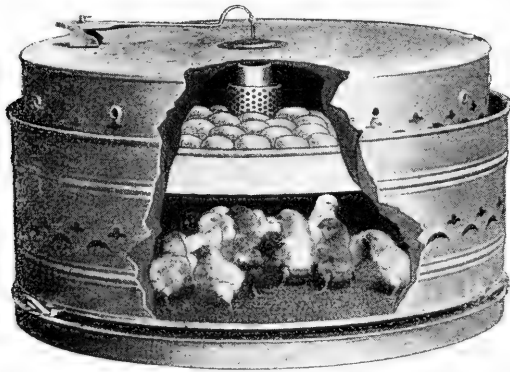
ing them in brooder coops all of these dangers are eliminated and the success of the work may be assured.

There are many reasons why farmers do not make as much from the poultry as they should. One of these reasons is because the hens are kept until they are too old to be profitable, another the loss in trying to raise chickens to replace the hens and also because the chickens are generally raised too late in the season to reach maturity at a time of the year when they would be most profitable. When considering the appliances used by the average farmer for raising chickens it is not surprising that the results have not been more satisfactory. The investment required for the total equipment to raise five hundred chickens annually and to keep two hundred laying hens is small in comparison with any other farm investment, that would yield an equal income. It is also a business that can be built up gradually and by starting with an equipment to raise a hundred chickens and keeping fifty laying hens the capital required would be a very small amount.

The profits derived from a smaller flock used to increase the equipment will soon give one an ideal poultry plant, large enough to meet the requirements of the farm. There are a great many farms where five hundred, a thousand or even more hens could be kept and each one made to produce an income equal to those of a smaller flock. It would be best, however, to master the details of the work while keeping a smaller number of hens when it will not be difficult to increase the number provided the conditions and surroundings can be made as favorable for a larger number.

When one is making a specialty of the poultry business in the city and suburbs where it is necessary to purchase all of the food, better results can be had by keeping them confined to coops. When handling poultry in this way it requires more labor and the one in

charge must have more knowledge of the work as it will be necessary to be the judge in regard to the different kinds of food and the amount of each kind the hens are allowed to eat. When they are on unlimited range there is generally an opportunity to make their own selection and they nearly always find things best

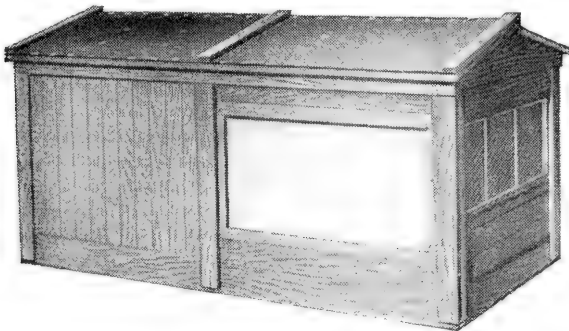


The Brooder Hatcher is an ideal machine for poultrymen with small flocks.

adapted to their requirements. There are, of course, times when an expert who has made a very careful study of feeding for the production of strong, fertile eggs can get better results feeding in coops than are had from hens on free range as they are not altogether unlike people and will sometimes eat large quantities of things not best for them. A real expert feeder has a better knowledge of what the hens should consume, although the hens natural ability to select certain kinds of food will generally produce better results than when compelled to eat things given them by one who does not thoroughly understand the work.

There are but few people who realize the impor-

tance of a correct system of feeding in order to get eggs that will produce strong, healthy chickens that are easily raised. They seldom take into consideration the fact that the chicken must develop and grow from whatever elements the eggs contain and that these elements vary in quality in accordance with the variation of the quality and kind of food the hens consume. The protein in the egg is one of the most important elements for the life and growth of the chick. When this protein is of an inferior quality and insufficient in quantity the

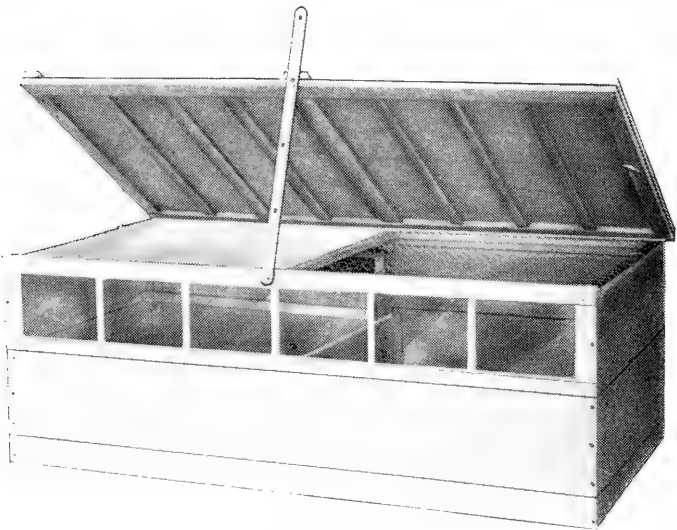


The Adjustable Coop has some advantages in hot weather and it also keeps fowls comfortable in zero weather.

chick will die in the shell and this often happens the first week after incubation starts and sometimes at later stages of the growth, even up to the hatching time. When the necessary elements of the proper quality in the egg have been used the chicken cannot live and the size of the egg does not have as much bearing on the size and strength of the chicken as the quality of the food the egg contains and a very small egg from the best system of feeding will often produce a better chick than is hatched from large ones that have been laid when the hens were not properly fed.

The chicken is grown entirely from the white of the

egg and the yolk has nothing to do with its growth. When it is fully developed and leaves the shell, it then absorbs the yolk which furnishes food for three or four days or until the chicken is old enough to derive nourishment from the food it consumes. When the elements of the yolk are of an inferior quality there is no chance for the chicken to live but when the yolk is composed of the correct proportions of easily digestible food there is but

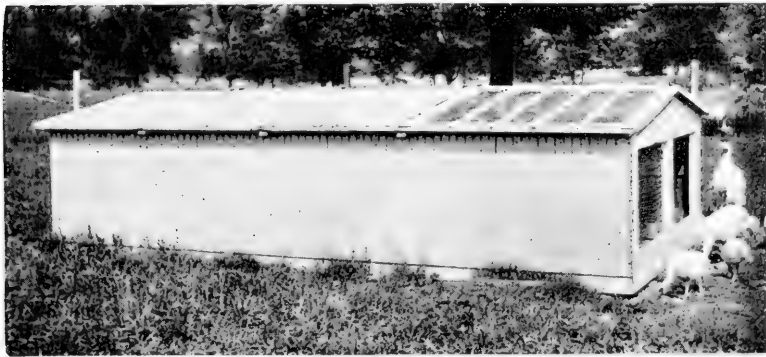


The Economy Coop is inexpensive and furnishes comfortable quarters for choice pens of fowls.

little difficulty in raising the chickens and they will grow and thrive on food and treatment that would be sure death to a chicken hatched from an egg having the yolk composed of a poorer quality of indigestible food.

Free range on the farm and the coop system for specialists in town will always be found the most profitable. We have studied many years and have made a great many experiments in the use of different kinds of

houses and coops for poultry and now have two kinds of coops for farm use, one is high enough for a man to enter and the other one only high enough for the fowls' comfort. This coop furnishes better conditions for the poultry and the larger coop has some advantages for the poultryman. The higher coop is more expensive to build and will probably last a little longer although the



Twenty-five hens in a Utility Coop should net the owner fifty dollars profit in twelve months from the sale of market eggs.

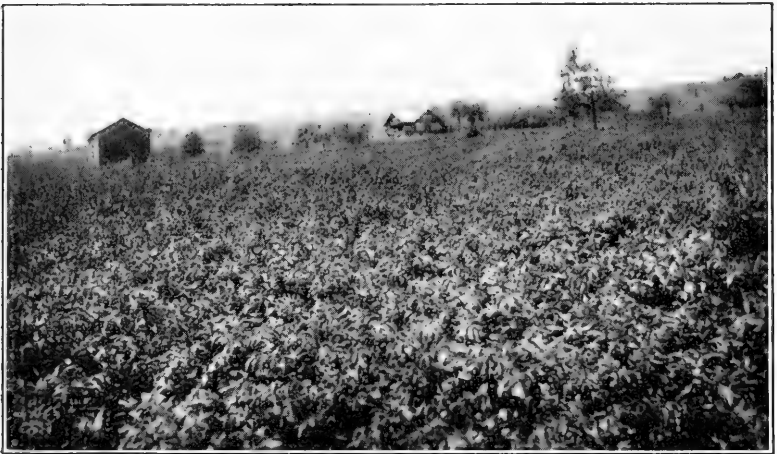
results will not be any better than may be expected from the lower coops. Some of the larger coops can also be used to advantage by expert poultrymen who make a specialty of the business, although the smaller coops will always give one better results for pedigree breeding and by their use the egg production is greatly increased. A few of these smaller coops can always be used to advantage on a farm for broody hens and also when one wishes to keep a few of the finest specimens of the flock together for breeding purposes and the larger coops can be used to advantage in the city for growing chickens.

It is hardly possible to cover all details of the poultry business in this book as thoroughly as would seem

best. The suggestions offered and thoughts advanced are furnished largely to give farmers an opportunity to see the possibilities in the poultry business. We are in position to furnish additional information to all those who may require it.

POTATOES.

Both Irish and sweet potatoes are very valuable as stock food and should be raised on nearly all farms. Sweet potatoes cannot be grown to advantage except in



A field of potatoes on land that cost \$16.00 per acre.

localities where the summer season is long enough for a crop to mature before frost. Irish potatoes can be profitably grown in nearly all sections of the United States, including the extreme south, and they do not draw as heavily on the soil as most crops having an equal value in market or for stock food.

To grow a perfect crop of Irish potatoes there must be plenty of nitrogen and humus in the soil to give the vines a good start as it is impossible to grow a good

crop of potatoes with small vines and the other fertilizing elements necessary for growing the tubers will not make thrifty vines without the nitrogen. Even where land is deficient in potash and the other elements necessary for the tubers, strong, thrifty vines will go a long way towards gathering the limited quantity of the elements necessary to grow potatoes. Our farm land in this vicinity, especially on the hills, has all the necessary elements in very large quantities for grow-



A few of the crates in the corner of a field where the land had been improved by plowing under alfalfa.

ing a perfect potato crop with the exception of humus and nitrogen. When these elements are supplied by sweet clover and alfalfa the conditions are made ideal for potatoes and by proper spraying and cultivation it is not difficult to get from two to three hundred bushels to the acre without the use of commercial fertilizer.

Potatoes make excellent stock food, either cooked or raw, and can be kept in perfect condition for feeding for several months. When there are more small pota-

atoes than can be fed while they are in good condition and at times when the market price is below thirty cents per bushel, the potatoes can be sliced, dried and kept indefinitely making the best food for horses, cattle or swine. They can also be ground into meal. Whole potatoes at thirty cents per bushel have a feeding value when dried about equal to oats at fifty cents per bushel. By having a good supply of dried potatoes, other root crops and the best quality of alfalfa hay, stock can be kept in perfect condition without any grain and as the cost of grain is taking the larger portion of the profits from the average dairy farm those who learn a system of farming that will give them equal, or better, results without buying grain will find their profits increasing rapidly.



Many Florida farmers seem to think that corn will not grow well there. This photograph, taken in July, shows a field planted in April on land where a crop of beans had been recently harvested, making the second crop on the same land in about six months.

FARMING IN FLORIDA

Quite a large tract of farm land was purchased about three years ago on the east coast of Florida in Palm Beach County. Since that time I have been gradually increasing farm operations and have made many interesting experiments.

I have discovered that the very same way of handling the soil on our farms in Elmira will also produce excellent results on our Florida Farms, although it is necessary to change the plan of farming because of the continuous growing season and the possibility of raising several market crops on the same land each year, in addition to devoting at least one crop exclusively to soil improvement.



This illustration shows the ends of the rows of our Florida corn field. By comparison to the size of the man it is not difficult to tell whether the Florida conditions are favorable for raising corn.

It is believed that the greatest mistake that is now being made by nearly all Florida farmers is in devoting their time almost entirely to one crop. When the growing season and the market conditions are most favorable one crop will often furnish enough funds to pay the living expenses of the average farmer for several years.

Such cases, however, are the exception and not the rule. The plan of diversified farming has even more advantages in Florida than here in New York State because of the continuous growing season and the fact that poultry and all kinds of stock do exceptionally well there. Everyone who wishes to make the greatest success at Florida farming should gradually develop the work along this line.

When farming during the winter months, I have often wished that it would be possible to continue the work throughout the year and I am planning to devote more time on the Florida Farms in the future and expect at some later date to publish a book devoted exclusively to farming in Florida.

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