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THE PROGRESSIVE FARMER.

Has the largest circulation of any family agricultural or political paper published between Richmond and Atlanta

THE INDUSTRIAL AND EDUCATIONAL INTERESTS OF OUR PEOPLE PARAMOUNT TO ALL OTHER CONSIDERATIONS OF STATE POLICY.

Vol. 13. RALEIGH, N. C., JUNE 28, 1898. No. 21

Agriculture.

EDITED BY BENJ IRBY, RALEIGH, N C

Prof. Benj. Irby, late Professor of Agriculture, Agricultural and Mechanical College, Raleigh, has become a regular contributor to this department. All questions relating to the farm, garden or orchard will be answered by Prof. Irby.

THE CAMPBELL METHOD OF SOIL CULTURE.

Correspondence of the Progressive Farmer.

"What is it?" a great many will ask. Yes, I say, great many farmers know nothing about the campbell method of farming, and yet it has been in operation in the Northwest for the past two years and the papers have had much discussion on the subject. In my travels through ten States this last winter not one third of the farmers that I met had ever heard of this system of farming, so I will give the readers of this paper an outline of its working.

In the first place, deep plowing is necessary, about eight inches at least, and is followed as close as practicable with the Campbell Subsurface Packer, a special tool which packs the bottom half the furrow and leaves the top loose and in good condition to receive the seed. It is drilled with a special drill, the rows being twenty inches apart, the drill seeding six rows at a time, using wheat at the rate of about twenty pounds per acre and oats about one half bushel.

Then comes the cultivating which is done with the same machine that we drill it with, removing the seeder box and the runners and putting on cultivator teeth in their place and cultivating six rows at a time, the same ones that were seeded. I have no trouble in cultivating thirty acres a day with one machine and two horses. This cultivating must begin as soon as one can follow the rows nicely and continue until the grain is in bloom, and should be done at least once a week. Although there can be no stated rule to go by in this respect the idea is to keep the top two inches loose and dry, thus forming a dust mulch, and the drier and hotter the weather the more one has to cultivate, and also after a rain as soon as the ground will work up fine.

I had in sixty acres last year under this method with very satisfactory results, although it was all sowed from three to five weeks later than my grain put in the old way. I had ten acres of oats that went about twice as many bushels per acre as they did under the ordinary method. My wheat made about the same average as it did the old way. But if we can get as many bushels per acre as by the old way, we are ahead, as the saving in seed this spring will pay for the extra cultivating, and our ground is left in the best condition possible. I am disking up a lot of ground where I practiced the Campbell method last year and put it in with a press drill, and I believe it will equal corn ground or summer fallow.

Now, fellow farmers of the semi-arid belt, look into this matter and see what there is in it. Try it on a small scale without special machinery and be convinced. The biggest argument I have met against it is that it is too much work. Now I will say to all who look at it from this standpoint that they had better quit farming if they are afraid of work, and move into the crowded cities and join the thousands of poorly-paid laborers and idlemen.

S. D. GREGG.

Stark Co., N. Dakota.

SHARP TOOLS.

Above all things a farmer should keep his tools, from harvester, sickle and plowshare to scythe and hoe, sharp and bright. No man can do good and effective work with a dull tool, and every farmer should be ashamed to have a rusty one about his place. There are sickle grinders on the market that will make a sickle as sharp as a razor in a few minutes, while they are so nearly automatic that about all one has to do is to set the sickle in a frame and turn a handle. A light team will draw a mower fitted with a sharp sickle through the heaviest kind of grass with ease, while it would almost kill a heavy team to draw a dull sickle through it, says Farm and Fireside.

Some farmers have the blacksmith draw the edge of the plowshare out very thin and then touch it up a little every morning and noon with a heavy file, while others keep an anvil and beat them out every morning. This latter operation requires some skill and good eyes, as well as a second person to hold the plow.

If a man has no handy power to turn the grindstone it should be set in a frame with a seat and two treadles so that one man can run it with ease and grind any tool rapidly. I notice that forty five to fifty pound stones fitted with seat and treadles are sold for $2 70. A man can turn a stone so fitted much steadier and easier than a tired, small boy can, and when he bears on a little too heavily he knows it.

For sharpening hoes, spades, shovels, etc., a good file is best. When I buy a new spade or shovel I have the blacksmith draw the edge out thin, so that it can be easily kept sharp with a little filing occasionally.

AGRICULTURAL EXTENSION WORK.

The New York legislature seems to be much more liberal than that of any other State in its provisions for spreading a knowledge of the agricultural sciences among the masses of its people. Not satisfied with one experiment station, they provided for another, and each of these stations is supplied with a most liberal number of trained specialists. While Pennsylvania station has but twelve staff specialists, Minnesota station twelve and Texas station but eleven, the station at Ithaca, N. Y., has thirty and that Geneva, N. Y., nineteen, a total of forty nine for the State.

But the New York legislature went even beyone this. Some four years ago, in what was known as the Nixon bill, it made an appropriation of $8,000 to extend the teaching of the State Agricultural College to the masses by short schools of one week, to be held in thickly populated communities. This appropriation has been increased from year to year till it is now more than four times as large as at first, and the scope of the extension work has been expanded to include instructing the public school teachers how to teach the elements of agricultural science in the free schools, the carrying on of a correspondence school of agriculture for adult farmers at their homes, the organization and direction of agricultural reading circles among farmers, the courses to be mapped out by the station professore and much of the matter to be furnished by them, and co-operative experiments to be carried on by farmers throughout the State under the direction of the Station staff.

Bulletin 146 of Ithaca Station reports what has been accomplished during the past year under this Nixon bill, and the results are certainly most gratifying and encouraging.

With the view of carrying the university extension work in agriculture to the farmers, early in the spring a circular was prepared describing some simple tillage experiments with potatoes, corn or sugar beets. Such decided results have been secured at the station grounds by frequent and long continued tillage of the potato, that it was desired to learn if similar results might be secured by the farmers of the State, and with other crops as well as with potatoes. Correspondence was solicited with farmers who were willing to undertake experiments in co-operation with the station. The department of agriculture at Washington supplied us with a quantity of sugar beet seed which was sent to farmers asking for it so long as the supply lasted.

The interest of the farmer seems to center in the sugar beets, very few undertaking tillage experiments with any other crop. Nor were many of them so much interested in the effect of different methods of cultivation upon the crop as they were to discover if, under the system of cultivation most common in the vicinity or most convenient to them during the season, their soils would produce a large yield of beets of sufficient richness to be profitably manufactured into sugar. There was, therefore, very little uniformity of methods in preparing the soil or cultivating the crop, and few attempted the comparison of different methods on the same field.

During August, members of the station staff visited a large number of these experimental plats to note the conditions existing and advise the farmers in regard to their care. Again, in October, representatives of the station helped to harvest parts of many of them.

It was decided at the first meeting of the faculty of agriculture to emphasize the educational work, since the Federal Experiment Station, a department of the college of agriculture, was able to carry on many investigations, especially those which of necessity must extend through considerable periods of time, and which require ample and permanent laboratories, equipment and investigators, while most of the work contemplated under chapter 128 could best be carried on away from the college.

The problem of how to successfully introduce into the schools of the State a study of the fundamental principles which govern the soil, the plant and the animal, or the study of agriculture, has been considered most carefully by many distinguished educators. This subject was long and carefully considered by the faculty of agriculture before entering upon the work. The leaflets on nature study which were already issued had been so kindly received and so fully appreciated that it was decided to issue others and to employ trained teachers, to visit the schools and to attend teachers' institutes for the purpose of explaining how the subject matter of the leaflets, as well as other similar subjects, might be used as texts by the teacher, while the illustrations could not help but be useful to the teachers of classes in drawing. It was hoped, too, that after the teacher had given instruction on some subject intimately connected with natural objects which attract the attention of the pupil, the object having been used for a drawing in the class room, the description of such object would form a most interesting subject for compositions, which are now required in most departments of the public schools. By correlating with composition and drawing work the objection of an added study was removed.

It is believed that a study of the more common and familiar objects of nature leads directly to a better understanding of those laws and phenomena which are the very foundation of improved agriculture. In the hands of the skillful teacher the leaflets may be used to impart valuable lessons in natural history and in the conservation of energy as applied to rural affairs, and may in some cases serve to interest teacher and pupil in the economics of agriculture. Briefly stated, it is hoped that such instruction will lead logically and naturally to a greater love for rural affairs and a more rational understanding of them by young and old.

Eight leaflets have been published and distributed free, and so great has been the demand for them that it was necessary to print a second edition of all of them, while some have run through five and six editions, and the demand is now beyond the facilities of the college to supply.

More than 700 lectures have been delivered throughout the State by specialists; 30,000 common school teachers are enrolled and receiving and using the leaflets, and many have attended the lectures explaining the methods of presenting nature study work in the schools. Sixteen thousand school children have received those leaflets which are especially adapted to their needs. Two thousand five hundred young farmers are enrolled in the agricultural reading course. These are assisted from time to time by means of printed circulars which give directions and assistance to the farmer in carrying on his studies at home. From time to time question papers are sent out for the purpose of giving opportunity to the farmer to make known his needs, that they may be more fully understood and met.

It is believed that the benefits derived from carrying the experimental work beyond the limits of the station grounds are very great. First, the data obtained are valuable. In some cases they are much more valuable than could possibly be obtained from experiments conducted at the station. In corroboration of this statement, reference is made to the bulletin on sugar beets. Second, the station is brought into closer touch with the farmers. Meeting them on their own farms, the station workers become better acquainted with their peculiar surroundings and needs, and can offer more appropriate assistance than they otherwise could do. On the other hand, the farmers learn better how the station can help them and how to avail themselves of that help. Third, the experiments serve as an object lesson to the farmers. As such they impress themselves upon a large class of farmers that would give little heed to a printed description of experiments conducted at the station. Fourth, the experiments have a high educational value for the farmers performing them. Perhaps, at the present time, this is the most important consideration. There are many questions affected by soil and climate that must be decided for each locality individually, and the greatest hindrance is the want of trained experimenters to take up the work. It is hoped and believed that we shall find in various localities in the State intelligent and public spirited farmers who, for the benefits to be derived by themselves and their fellows, will be willing to co operate with the station in this work.

Observations in the dairy districts led to the conclusion that this branch of agriculture needed assistance. The theory of making butter and cheese is fairly well understood but the art, in many cases, was found to be lamentably wanting. To bridge over this gap between science and art, two expert dairymen were employed during the summer, men who not only knew much of the science but of the art of dairy husbandry as well. These men went from factory to factory, called a few dairymen together and gave valuable instruction by first teaching the leading principles and then by practically applying them. Incidentally these instructions did much good by calling attention to untidy surroundings and irrational methods of treating cattle.

There has been a demand for information on many subjects, but especially on the subject of sugar beet and potato culture. This demand has been met so far as possible by sending from time members of the straff who are espacially qualified to give the information desired. This branch of educational work has been most satisfactory, the meeting being well attended and the interest high as usual.

A valuable feature of many of the meetings was the demonstration of how certain scientific tests relative to soil might be made by the farmers. In this connection the test for acid in soils by the use of litmus paper may be mentioned. Results from this work show that our sour soils are quite prevalent, and promise a good field for investigation.

Last year an attempt was made to establish a farmers' home reading course, but it was not fully organized because of press of work in other directions. At the present time 3,000 young farmers are registered with us, and a circular containing sixteen pages, entitled "Farmers' Reading Lesson, Texture of Soil and Conservation of Moisture," has been issued with the view of giving help, direction and definiteness to the work. Accompanying this circular is another one of eight pages which contains twenty seven questions, the aim being to draw out the reader and awaken interest. It is believed that the young farmer already possesses much valuable information which, if drawn out and supplemented, would be mutually interesting and valuable.

It is our plan to arrange a course of topics having a logical connection and divided into stages of advancement. The study of these topics can be carried on at the farmer's home with a review by correspondence, after the Chautauqua reading course plan. If neighbors can form a circle for discussing the subjects under consideration, interest and benefit will be very much enhanced.

This seems to be true popular education and it seems to be truly popular. Who can measure the benefits, individual and public, sure to flow from it?

DIVERSIFIED FARMING.

This is a subject which cannot be too often brought to the attention of farmers everywhere, because it is the most rational as well as the most profitrble system that has ever been devised.

To raise corn alone or wheat alone or cotton alone is not the part of wisdom, says Farmers' Voice. Thousands of acres of Kentucky land is barren because it has been devoted to tobacco exclusively and multiplied thousands are barren in other States because cotton, wheat or corn has been grown year after year, until the plant food for the particular favorite crop is exhausted.

There is hardly a place in the United States where the farmer is confined to a single crop as his main dependence. He can rotate corn, oats and grass or clover; corn, wheat and clover, or corn, oats, wheat and clover in the corn belt, cotton and almost any other crop or series of crops in most of the cotton belt and even the great wheat fields of the Northwest may be given over to a rotation of at least three years' duration to the benefit of the land.

When one crop fails from stress of weather another is usually the better for it. This year the corn prospect is very bad, while in the same sections, wheat, oats and meadows are looking better than usual, and the man who has diversified crops is able to face the situation with calmness.

Our Southern brother who devotes his whole time to cotton and buys everything he needs in the way of food, might profitably devote a few acres to growing food supplies with great profit, and if to these he would add live stock he would find a profitable market for his stock and secure the best fertilizer for his cotton at the same time.

The old saying about keeping all the eggs in one basket still holds good.

THE UNIFORM BALE.

Its Projectors Claim That it Will Save Money for the Farmers.

Col. E. S. Peters, of Calvert, Texas, President of the Cotton Growers' Protective Association of that State, stopped over in our city yesterday on his way home from Atlanta, where he had been attending a meeting of the ginners, compressmen and planters in the interest of a standard uniform square bale of cotton of the size adopted and recommended by the Maritime Associations and Cotton Exchanges of Galveston and New Orleans, the Ginners' Association, the Interior Cotton Buyers' Association and the Interior Compress Association of Texas. An Advertiser reporter finding him in the city looked him up and interviewed him on the general situation of Texas, and incidentally on the advantages to be derived from getting the cotton planters closely allied, looking to a general improvement for their betterment. It seems that under the auspices of this association in Texas there has been arranged a great diversity of the crops. The farmers have been drawn closer together for their mutual benefit, and a great reform in the baling of cotton has resulted, and the barrier heretofore existing between the planters and the merchantile interests have been broken down and they are now working in unison and harmony to secure a diversity of crops and the improvement of American cotton baling to the standard size, 24x54 inches. There are too many advantages to be derived from the adoption of this size bale to be covered in a short interview. He said among other things that the adoption of this uniform bale will not only save the farmers a vast amount of money, but it will so improve the present system of baling cotton, that if at any future time a better system should be introduced the farmers would be in a position to fix the terms upon which they would use it. At the meeting in Atlanta Mr. A. F. Churchill, of Brunswick, Ga., a large steamship agent, said that if he could be given cotton pressed in this uniform box, 24x54 inches, of an average density of forty pounds per cubic foot, which it has been demonstrated could be obtained, he would be willing to make contracts for the delivery of cotton from Brunswick to all European points at a reduction in freight rates of 50 per cent. He stated that the present rate from Brunswick to Liverpool and Bremen was 65 cents, and that for cotton baled by this standard he would be willing to make contracts at 32½ cents per hundred pounds, thereby creating a saving to the farmers of the South of $1 67½ per bale.—From Montgomery Advertiser, May 15, 1898.

HOW TO STUDY THE NEEDS OF CROPS.

A gentleman in Pennsylvania writes: "Please tell me the amount of nitrogen, phosphoric acid and potash removed from the soil by the crops of wheat, corn, oats and potatoes. Say amount from a given number of bushels."

Consulting the best authority at hand, and the results in our own station, we give the following: A crop of wheat, yielding twenty bushels of grain per acre, will remove from the soil in the grain 25 pounds of nitrogen, 12 5 pounds of phosphoric acid, seven pounds of potash and one pound of lime; while the straw will remove 10 pounds of nitrogen, 7 5 pounds of phosphoric acid, twenty eight pounds of potash and seven pounds of lime. A crop of oats removes in the grain, in a crop of 50 bushels per acre, 35 pounds of nitrogen, 12 pounds of phosphoric acid and 10 pounds of potash; and in the straw 15 pounds of nitrogen, 6 pounds of phosphoric acid and 35 pounds of potash. A crop of corn, of 65 bushels per acre, removes from the land in grain and fodder, 75 pounds of nitrogen, 20 pounds of phosphoric acid and 60 pounds of potash. A crop of peas of 30 bushels will remove no nitrogen from the soil, but will increase it, and remove 25 pounds of phosphoric acid and 60 pounds of potash and 75 pounds of lime. A crop of potatoes making 150 bushels per acre, will remove from the soil 40 pounds of nitrogen, 20 pounds of phosphoric acid, 75 pounds of potash and 25 pounds of lime.

These figures are suggestive, for they show the great relave importance, so far as the mineral plant foods are concerned, of the straw from the crops of small grain. They show, also, that the farmers are right in attaching special importance to nitrogen and phosphoric acid for the production of wheat.

But it might be said, why are these not of equal or greater importance with the corn crop, which removes so much more nitrogen from the soil? We must reflect that the corn crop is grown during our long and hot summers while the nitrification is most active in the soil, and wheat draws upon stores of nitrogen accumulated there beforehand. The relative importance of the draft of corn on the mineral elements of the soil, particularly potash, is far greater than the draft on the nitrogen, which is accumulating there. The phosphoric acid and potash are drawn from the store in the soil, and represent actual withdrawals that cannot be replaced except by the cultivator himself. Hence in all artificial manuring for the corn crop, we find that the phosphoric acid and the potash are the chief needs that should be provided for. The same may be said to a greater extent of the potato crop. While a larger percentage of nitrogen is demanded for the early potato crop grown in the South for Northern shipment, the crop in the North is grown during the same nitrifying season as the corn crop, and being commonly planted on sod land, has the advantage of the nitrifying decay of the sod. But the potato crop draws greedily on the accumulation of mineral matters in the soil, particularly the potash, and while the plant can get a part or all the nitrogen needed from the vegetable decay in the soil, the entire percentage of the mineral matters must be gotten from the store already in the land, and is an actual withdrawal of matters that cannot be replaced without cost. It will not do then to assume that in compounding a fertilizer mixture we should adopt the proportions of the three principal plant foods shown above, for if we do we will in many cases have too large a percentage of nitrogen, and hence increase too largely the cost of the fertilizer.

The whole trend of modern farming is towards the economizing of fertilizing matters that can be had without expenditure, and which costs when purchased more than others that must be replaced by man. And yet the makers of fertilizer uniformly go upon the supposition that all the matters shown to exist in the crops should be placed in the fertilizer in nearly the proportion in which they occur in the crop, so far as the nitrogen is concerned. And this, as we have said, is the very ingredient which costs the farmer most, and in which there is the greatest room for fraud.

When the fertilizer makers come to the mineral plant foods, the practice is too reverse. In almost all the mixtures advertised for potatoes we find that the percentage of phosphoric acid is far higher than that of potash, while in a crop like the potato, the amount of potash removed by rhe crop is more than three times that of the phosphoric acid.

In fertilizers mixed for the corn crop, the discrepancy is still greater, for while the corn crop removes exactly three times the amount of potash that it does of phosphoric acid, in most of these mixtures there will be more than double the percentage of phosphoric acid than potash. Hence arises the importance of home mixing of fertilizers, if we want to get just the thing our crops need. While by proper farming and the use of legumes we can get all the nitrogen needed by the ordinary farm crops, there is no way in which we can replace the waste of phosphoric acid and potash except by adding them artifically to the land. If a crop then removes 20 pounds per

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