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

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THE NATIONAL FARMERS' ALLIANCE AND INDUSTRIAL UNION.

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PAPERS.

Progressive Farmer, State Organ,	Raleigh, N. C.
Scandalum,	Raleigh, N. C.
Hornet,	Hickory, N. C.
Rattler,	Whitakers, N. C.
Our Home,	Beaver Dam, N. C.
The Populist,	Lumberton, N. C.
The People's Paper,	Charlotte, N. C.
The Vestibule,	Concord, N. C.
The Plow-Boy,	Wadesboro, N. C.
Carolina Watchman,	Salisbury, N. C.

Each of the above-named papers are requested to keep the list standing on the first page and add others, provided they are duly elected. Any paper failing to advocate the Ocala platform will be dropped from the list promptly. Our people can now see what papers are established in their interest.

AGRICULTURE.

Next week we shall publish an article on the "San Jose Scale" written especially for THE PROGRESSIVE FARMER by that veteran fruit grower, Mr. J. Van Lindley, of Pomona, N. C.

American Gardening recommends putting turnips that are to be used on the table in barrels in layers of sand. Putting the turnips will also keep them fresh and plump, but the sand packing would be good where the roots are to be kept in a cellar.

It will pay you to ditch out and clear up that muck swamp. It is composed of decayed vegetation and the very best elements of the higher land around it that have washed down into it. It will soon pay for itself in any crop you may grow upon it.

Farmers Voice truly says that it is an uphill business to attempt to eradicate the weeds from a man's own farm when the winds which blow and the birds which fly and the wagons which travel up and down the roads all carry the seeds of a neighborhood to his acres; but thus it must ever be until farmers unite their forces in the assault upon them.

We are glad to note that North Carolina farmers now seem to realize more than ever the need of education even in farming. An evidence of this is found in the increased attendance of nearly all our schools, and especially the A & M. College at Raleigh. An exchange wisely says that education is as essential for the farmer as for any other man. Good farming consists not wholly of manual labor; it requires the exercise of good intellectual powers. There is a vast difference between scientific and theoretical farming. If farmers will cultivate the mind as well as the soil, perfection in agriculture could be approached in a few years. The tilling of the soil is destined to become the most learned and practical of all the professions.

WEEKLY DIGEST

Of Experiment Station Bulletins.

No 87.

EFFECTS OF ROTATION ON SOIL FERTILITY

The effect of crop rotation and also of farm manures on the humus content and fertility of soils has been under investigation by the Minnesota Station since the spring of 1892, and bulletin 53 gives an account of the experiments and the results reached.

The field chosen had been growing small grain for forty years without fertilizing, and though somewhat exhausted, was in fair condition as to fertility. It was divided into six plots, and all were sown in wheat the first year to see if they were of equal and uniform fertility. None differed in yield more than a bushel per acre.

The plan of the experment was to grow wheat continuously on one plot, oats on another, barley on a third, corn on a fourth and all these crops in rotation with clover on the fifth, and in rotation with clover with clover and manure on the sixth. Each crop was weighed and analyzed, and the soil of each plot was analyzed before and after the experiment to determine the gain or loss of fertility. The land was well drained and in good mechanical condition, and the plots were separated by strips six feet wide.

The rotation on one plot was first year wheat and clover, second year clover, third year wheat, fourth year oats, fifth year corn and manure. The other rotation was first year oats and clover, second year clover, third year barley, fourth year corn and manure. It was found that the clover seeded with wheat did much better than that sown with oats, yielding over a thousand pounds more hay per acre the second year. This is probably due to the fact that oats are deeper rooted and grosser feeders than wheat, and hence they deprive the young clover of more of the soil food than wheat does. It is well known that oats will find soil food enough to make a good crop on soil too poor to produce wheat.

In 1895 the plot that had been in wheat continuously yielded 17 bushels per acre and the soil showed a loss of 171 pounds of nitrogen per acre, only 25 of which was found in the crop removed, hence the other 146 pounds must have been leached out by rain and evaporated into the air. On the other hand, in the same year (1895), the rotation plot, which had been in clover the year before, yielded 22 bushels of wheat per acre, and the soil showed a gain of 61 pounds per acre each year of the rotation, notwithstanding more had been removed by the crops, because they were larger than on the all wheat plot. It is thought that this gain is due to two facts namely: First, the clover gathered and stored in its roots and stubble a large amount of free nitrogen from the air; second, the humus added to the soil by the decaying roots and stubble of the clover held the soil moisture in which much nitrogen was dissolved, as a sponge holds water, thus preventing much loss by leaching and evaporation.

These results show that in continuous wheat growing the soil becomes so barren of humus that it loses by leaching and evaporation five pounds of nitrogen for every pound used by the crop. Oats and barley show about the same rate of loss.

In 1896 the rotation plot produced but one fourth of a bushel more oats per acre than the plot that had been in oats continuously, because of the above noted ability of oats to get a good living on poor soil; but the all oats plot lost 196 pounds of nitrogen per acre, while the rotation plot still showed a net gain of nitrogen.

In 1896 the plot which had been in corn continuously yielded 44½ bushels per acre, and the rotation plot, with manure, yielded 66¾ bushels per acre—a gain of 22 bushels per acre, and at the same time the all-corn plot showed a yearly loss of 84 pounds of nitrogen per acre; while the rotation plot showed a substantial net gain of this valuable fertilizing element. Of the 84 pounds lost annually on the all corn plot, 55 pounds were stored in the crop and 29 lost by leaching and evaporation. Thus it is seen that while wheat, oats and barley lands lose about five pounds of nitrogen for every pound used by the crop, corn loses but little more than half a pound of nitrogen for each pound used by the crop. This is thought to be due to the fact that the corn crop shades the land throughout the hot summer, while the wheat, barley and oats are removed in midsummer, leaving the soil exposed during the hottest season to the volatilizing effect of the August sun. For this reason it has been found that the growth of a crop of corn between two wheat crops is less exhaustive to the soil than a bare summer fallow between two wheat crops. It also forcibly illustrates the importance of keeping the soil covered by some useful crop throughout the summer season.

In 1895 the plot which had been continuously in barley yielded 35⅜ bushels per acre, and the rotation plot yielded 42½ bushels per acre, a gain of nearly four bushels per acre for rotation, and the rotation plot also showed a gain in nitrogen, while the all barley plot showed a heavy loss.

A strip of land adjoining one of the above plots was summer fallowed (kept plowed and cultivated, though no crop was grown,) for two years in succession, and instead of gaining in fertility, as is supposed by those who practice summer fallowing, analyses of this soil before and after the two years' fallow showed a loss of 590 pounds of nitrogen per acre. Nitrogen purchased in commercial fereilizers costs 12 to 18 cents per pound, an average of 15 cents, and at this rate the 590 pounds lost by the two years' fallow was worth $88 50, equal to $44 25 per year, a pretty substantial loss on a single acre of land. However, the poorer the land the less the loss; but the above ought to be sufficient to demonstrate the fallacy and follow of the summer fallow.

The latter half of this bulletin is devoted to a consideration of the value of humus, the ways in which it is lost from the soil and the most economical way in which it may be stored to the soil.

The animal and vegetable substances in the soil in varying degrees of decay or decomposition are collectively spoken of as humus, or organic matter. These substances, when they reach the proper stage of decay, unite, chemically, with the potash, phosphoric acid and lime of the soil, forming compounds called humates.

Humus has been found to be valuable in the following ways:

1 It absorbs or "fixes" nitrogen, thus preventing the loss of this, the most valuable of all fertilizing elements

2. It absorbs water, thus enabling the soil to better withstand drouths.

3 It renders potash and phosphoric acid soluble, so that they can be taken into the sap of plants through the roots.

For these reasons farm manures possess an advantage and value over and above the market price of the nitrogen, potash and phosphoric acid they contain. Their bulk is mostly humus, a valuable material which exists in very small quantities in commercial fertilizers.

For the same reason clover, peas and other green crops—even weeds—turned under, are largely beneficial to land, aside from the nitrogen they have gathered from the air and the phosphoric acid and potash their long roots may have brought up from the subsoil.

Investigations at the Minnesota Station prove the following interesting and valuable facts relating to humus: Farm manure, green clover, blood, fish, tankage, cotton seed, etc, produce humus rich in nitrogen, while oats straw, sawdust and carbohydrates form humus poor in nitrogen but rich in carbon, and the nitrogenous humus more readily unites with the potash and phosphoric acid of the soil to form humates than does carbonaceous humus. The humus of virgin soils is much richer in nitrogen and humates than the humus of soils that have been cropped for a series of years.

Forest fires have been found to cause a loss of as much as three-fourths of the total nitrogen of the soil by destruction of the humus. The practice of burning off lands preparatory to plowing often permanently injures their crop-producing powers.

Clean culture to hoed crops tends to exhaust soils of their humus, and this is why the old cotton fields of the South have become so poor. It has been found that the growth of clover, cow peas, etc, soon restores these lands to a high degree of fertility, if all needed potash and phosphoric acid be applied to the clover and pea crops.

Soils most in need of humus are sandy and sandy loam soils that have long received clean culture without the application of farm manure. Mucky, peaty, clay and prairie silos do not need humus for many years after they are put in cultivation. An ordinary prairie soil needs no humus added for about ten years after it is first put in cultivation.

Mucky and swampy soils are apt to contain sour humus in large quantities, and these must be well drained and dressed with lime or marl before they will become productive. Thus treated, a soil which is more than half humus may be brought into cultivation. They make fine permanent meadows. Such soils have been known to produce hay every year for forty years without any decrease in the annual yield.

In localities where the rainfall is evenly distributed throughout the year the loss of humus is not so severely felt as where there are periods of drouth.

MISCELLANEOUS MATTERS.

Bulletin 64 of the Virginia Station, describes many internal parasites of sheep, gives their life history, symptoms of infection and treatment. Following is the prescription for tape worm, which requires a much more powerful treatment than round worms: Areca nut, 2 drachms; powdered male shield fern, 1 ounce; mix and give at one dose. Repeat after ten days, if necessary. To avoid parasitical infection of sheep allow access to none but pure water, change pastures often and be careful to see that newly purchased sheep do not mix with the flock till they have been quarantined long enough and thoroughly examined to make sure that they are not infected. If one of a flock is found infected treat the whole flock as a precautionary measure.

Bulletin 31, of Wyoming Station, is intended to put the farmers and ranchmen of that State upon their guard against the worst weeds of Wyoming. Pen descriptions of these weeds are given, with their history, habits, dissemination, seeding, and the best means of combating them. Those treated of in this bulletin are Russian thistle, Squirrel tail grass, cockle, Canada thistle, Bull thistle, prickly lettuce, buffalo burr, poverty weed, rag weed, pig weed, dandelion, false flax, skeleton weed, wild tomato, dock, purslane, crab grass, mallow, cactus. burr grass, dodder, green foxtail, sunflower, cockle burr, tow thistle, yellow flax, hedge bindweed, wild oats, wild buckwheat, lamb's quarter, rib grass, porcupine grass, larkspur (poison), loco weed (poison), gum plant, wild mustard, shepherd's purse, Rocky mountain bee plant, wild liquorice, stick seed, goose grass, Spanish needle, march elder, pepper grass and wormwood sage. The State laws on weeds are also given.

Bulletin 34, of the Iowa Station, also treats of weeds, among other subjects. It is confined to a consideration of weeds of the mustard family. These embrace tumbling mustard, hedge mustard, false flax, shepherd's purse, horse radish, winter cress, wild radish or Indian turnip, etc. The best method of exterminating these troublesome weeds is to pull them out by the roots during any wet time when the ground is soft, before the seeds form. If the ground is thickly seeded, plow it shallow early in spring and leave it unplanted, but as fast as a crop of weed seeds sprout and appear above ground, run a two horse weeder over it, repeating as often as necessary till midsummer and then seed it to buckwheat, millet, cow peas, or some good late cover cover crop. Every State should have stringent anti-weed laws, fixing severe penalties for permitting weeds to go to seed in the fence corners or lanes about one's premises.

FARMERS AHEAD.

Statistics from the last census show that the United States contains to day 4 564,000 farms, of an average size of 137 acres each. Of the bread winners among the people 44 per cent. are engaged in agricultural pursuits. only 22 per cent., or just one half as many, are engaged in manufacturing. Twenty three per cent. are in professions of all kinds and in personal service, and 11 per cent. are engaged in trade and transportation. It will thus be seen that farming is by far the largest interest, engaging the most people. Of these 4 564,000 farms, a fraction more than 71 per cent. are occupied and cultivated by their owners and a fraction more than 28 per cent. are occupied by tenant farmers.—Prof. Georgeson.

There's pay in fruit raising provided the business is conducted as business should be. Some Tar Heel farmers realize the truth of this and profit by it. A recent issue of the Spartanburg (S. C.) Herald says: Wednesday afternoon three wagon loads of fine, luscious peaches were brought to the city from Chimney Rock, N. C., 17 miles above Rutherfordton. The wagoners sold the fruit at $1 per bushel.

PROF. EMERY WRITES.

Correspondence of the Progressive Farmer.

Noticing the letter of Mr. Cline, I was struck by his offer to send crimson clover seed into North Carolina as a novelty crop farmers ought to be acquainted with. That Dr. Haverdine may have made an independent importation of this seed no one will deny, but that he should be accredited with having started this crop in the United States is absurd. "There is nothing new under the sun," and this clover may have had a dozen independent introductions before this writer, Mr. Cline, or any other reader of THE PROGRESSIVE FARMER was born. Here at Raleigh we have an unassuming farmer who made an independent introduction of crimson clover into this section by bringing a little seed in his trunk from England about twenty years ago. It has been grown by him and others ever since, but has never been as extensively grown anywhere in America as in and around Delcaware within the last eight years. There the crop is properly valued as a land improver and as a cash crop for seed to sell.

Here in North Carolina crimson clover was known for at least forty years, as State Geologist Emmons makes some very accurate observations on it though falling into the error that it required a cooler climate than is found in Eastern counties. It was perhaps grown in his time by sowing in spring. If readers respond to Mr. Cline's offer of seed as farmers did to another from the Experiment station a few years ago his seed will soon be exhausted. About $140 worth of seed went off like hot cakes, and then only about one-third of the names listed were supplied. A notice had to be given that supply was exhausted.

Readers of THE PROGRESSIVE FARMER will do much better and credit themselves to buy seed of some growers and enter into the cultivation of this clover on a scale large enough to afford a cloverseed huller in every county or town, and make cloverseed, instead of cotton or tobacco, one of the cash crops. It will pay in increase of other crops in rotation. It will pay in itself

It will pay in the increased number of cattle, sheep and swine which can be better kept on the farm, and each animal made to sell for more money than formerly without crimson clover.

FRANK E EMERY.

Crops in the western part of the State are reported to be suffering less from drought than those in the central section. A correspondent of an exchange says: With an abundant wheat crop, corn above the average and an average day cash market for cattle, Macon county bids fair to receive her share of the good things of earth, and will join in a hearty thanksgiving for the return of better days.

LIME.

The proper and judicious use of lime is often an item of profit on the farm. Lime enters into the composition of plants and is an element necessary to their growth. The fact, however, that there is nearly always a sufficient supply of lime in the soil to serve as plant food proper, renders it seldom if ever necessary to apply lime to make up a deficiency. On the other hand, the aim in giving the soil a dose of lime is usually to improve its physical condition. If the soil is sour, lime will sweeten it; if it is light, lime will make it more compact; if it is too compact, lime will loosen it. An object lesson as to the effect of lime upon soil is illustrated in the following simple experiment. If two pieces of heavy clay soil, one of which has had lime sprinkled over it, are placed side by side, and allowed to dry in the sun, the one which has no lime on it will bake, become hard and crack, while the other piece on which lime has been sprinkled will become more porous and friable and crumbles easily when submitted to a slight pressure. The lime has permeated the pores and brought about this condition which is desirable in soils and which adds so much to their productive capacity.

On an average it will be found advisable to apply lime about once every five years. From thirty to forty bushels per acre of air slacked lime would be a sufficient quantity. It is best to broadcast the lime over the plowed surface of the field. Do not work it into the soil, as it will soon permeate of its own accord.

Besides, its action in improving the physical condition of the soil referred to above, the lime also liberates some plant food, notably potash. If potash previously existed in the soil in an insoluble state, the lime will make it available as a plant food. It would be poor policy, though, to continue to apply lime alone, since the soil would soon become exhausted of its natural supply of plant food which the lime has liberated. An economical plan, therefore, would be to keep up the soil's natural supply not only of potash, but also of phosphoric acid and nitrogen as well, since these are elements which usually become exhausted first, and which the farmer has to renew in the shape of manures, etc.

M. J SHELTON.

"GOOD FARMING."

A Maine paper gives an account of a farm near Bar Harbor, from which the owner receives a large annual income. "Pluck, energy and enterprise" are the terms used to explain his success in farming, but what does he sell? People who would do likewise will be pleased to learn that "last year he realized a net income of $7,000 from granite, gravel and loam which he sold from his farm."

If these are annual crops, we ought to know how to produce them without exhausting the soil. Another item in last year's sales was 100 cords of wood. As the farm contains but seventy five acres and produces eighty tons of hay, the woodlot must be getting small. It complicates the situation still more when we read that he keeps ten horses and and about a dozen cows and has already sold his eighty tons of hay for $20 per ton. Do his cows and horses live on the brush from the cordwood? There is nothing said about a silo, nor of any grain being grown. There must be another side to his account, and a bottom to his loam and gravel banks.

Holding up such a system of combined quarrying, forest destroying and soil robbing as an example of profitable farming through the exercise of "pluck, energy, and enterprise," is an insult to the farmers of the State, but is reported so often with slight variations that custom is supposed to sanction it.—Weekly Union, Manchester, N. H.

FARMING IN CHINA.

Mrs. E V. Edwards, of Minneapolis, read an interesting paper before the Farmers' Congress at St. Paul, her subject being "Picturesque Farming." She said:

"The chief product is rice, and each farmer has a few ducks who are trained to go upon the rice fields and eat the snails, frogs and other animals that infest the fields. Hens are also trained to follow the harvester and pick up every grain of rice that escapes his operations, for in China not even a grain of rice is wasted.

"This refinement of economy is shown in the care with which everything that could possibly add to the fertility of the soil is saved and applied. When the stubble is burned, clods of earth are piled up in little ovens to absorb even the smoke from the fires. The walls of abode huts which have received the smoke of the household fire and the exhalations of the human occupants for long periods are pulverized and added to the soil.

"Every farmer has his pig, and the animal is raised absolutely without cost. His habitat is the front doorstep, unoccupied otherwise, and he forages for his food. His head is the chief offerings for the household god, and his flesh, with that of the fowls, furnishes the family with meat." Mrs. Edwards referred to the fact that the hen is forced to work double time. She not only lays her own eggs, but the Chinese have a fashion of filling egg shells with the spawn of fish and allowing the hen to warm them into life. They are then placed in shallow ponds for further development.

Possibly no class of people give less attention to the little things pertaining to their profession than farmers. Yet "little things in agriculture represent the difference between profit and loss—a few more bushels of grain an acre, a little heavier yield of butter a cow, a little faster gain in the fattening cattle; proper care will procure all these." To neglect these little things means death to profit. Take him the world over and you will find that the man who has become a manager of great things is the man who is careful in regard to little things. In every profession we find that it is true that "an ounce of prevention is worth a pound of cure." The world moves and things on the world move with it. When once a thing gets started on the downward grade, it is doubly hard to change its course. Attend to the little things before they grow greater and possibly get beyond your control.