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

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"I am standing now just behind the curtain, and in full glow of the coming sunset. Behind me are the shadows of the track, before me lies the dark valley and the river. When I mingle with its dark waters I want to cast one lingering look upon a country whose government is of the people, for the people, and by the people."—L. L. Folk, July 15th, 1890.

## PRACTICAL FARM NOTES.

Written for The Progressive Farmer by the Editors and Hon. Guy E. Mitchell

Many disease germs thrive only in the dark. That is a good excuse for letting some sunlight into the stable and the hen house.

A poor animal cannot possibly make a good one by feeding. On the other hand a good animal can be easily made a poor one by the want of proper feeding.

Bedding should not be economized. Give the stock plenty of it to keep them comfortable and clean. None of it is wasted; it all makes manure.

The advantage to be derived from boiling potatoes for hog food lies in the fact that the potato is composed mostly of starch and in the boiling the starch cells are burst open and their contents rendered more digestible.

Assistant Secretary Brigham, of the Department of Agriculture, states that this year's distribution of seeds is the most satisfactory that has occurred. The seeds are being sent out by a New York firm which has its plant in Washington so that operations are directly under the eye of the Department. Laboratory tests are now being made of all seeds to show their germinative qualities, and during the coming season field tests will be made on the small "farm" which the Seed Testing Section has secured near the city. This test will show whether the seeds furnished are true to name and if they are not drawbacks will be made by the Department from the price for which the seeds are contracted.

The tuberculin test was employed by the Ohio Station with satisfactory results. Thirty one cows and bulls were subjected to the test and 14 of these responded. These latter were retested about two months later and the results then confirmed the first test. Finally the entire herd of the station was tested with the result of adding several more to the list of suspected cases. About ten months from the first test the animals were retested and fifteen head killed. The tuberculin test was confirmed in every particular, most of the animals being so diseased as to be condemned as unfit for food; yet they had shown no external symptoms of the disease and were in good flesh and apparently perfectly healthy.

Experiments at the Ohio Station have demonstrated clearly that the apple scab is the chief factor in the destruction of the apple crop and that this fungus can be kept under control by spraying. Four splendid successive crops were produced on the sprayed trees at the station while the fruit on the unsprayed trees in the same and neighboring orchards was worthless. The director, Professor Thorne, however calls attention to the fact that exhaustion of soil fertility, waste of

water, and insect ravages may all cooperate with scab or other fungus growth in shortening the crop, and says: "If our orchards are again to produce the great crops of earlier days, we must in so far as possible, restore the soil conditions to those days; we must avoid the waste of water in those sections where rainfall is scanty by preventing the growth under the trees of weeds or grass and by keeping the surface in such condition as to prevent rapid evaporation."

Alaska is to have a regularly organized experiment station and an annual appropriation of \$15,000 the same as the other stations. Professor George son, of Manhattan, Kansas, will shortly go out and take charge of the work. Mr. Georgeson spent last year in Alaska and brought back some fine reports of the agricultural possibilities of the coast country and some remarkable specimens of grain, grasses, potatoes, etc., which he had grown there. He believes that the country can be practically self-sustaining to the large number of miners who annually invade its mining regions, and he further believes that for scores of years to come the mineral output of the country will be very large. The gold will all eventually find its way to the States and tend to enrich the nation.

Consul Diederich, of Madgeburg, Germany, makes a supplemental report on the beet sugar crop of Europe which he states that the expected shortage of 350,000 tons is probably reduced by 200,000 owing to the more favorable prospects for the output of Germany and France. He yet states that the figures are approximate and that not until the last beet root has been taken from the soils and sliced will it be possible to state definitely the crop. Owing to small home consumption Germany is obliged to find foreign markets for two thirds of her product and most of this has heretofore gone to the United States. The great problem, says Mr. Diederich, at present is: When Cuba, Puerto Rico and the Philippines increase their production of cane sugar so as to supply the United States, what will become of the large surplus of German beet sugar?

The comparative amounts of food used by the various nations of the world are stated in a very interesting statistical article by George P. Waldron in McClure's Magazine. The world's average crop of potatoes is over 4,000,000,000 bushels; that of wheat 2,500,000,000 bushels, that of corn 2,600,000,000 and that of rye and barley, 2,000,000,000 bushels. In the consumption of potatoes Ireland leads with the daily average of 4 pounds to the person. In the use of meats the United States stands at the head of the list with 11,000,000,000 pounds per annum, or 147 pounds per capita. Of this in round numbers 5,000,000,000 pounds are beef, 4,000,000,000 pork and 8,000,000,000 mutton. Great Britain comes next to the U. S. in meat eating with an average of 100 pounds per capita. Italy uses but 24 pounds of meat per capita annually. The United States also leads in the use of eggs, fully 10,000,000,000 being required in the course of a year, or 133 eggs for each person. Again the United States stands at the head in the consumption of tobacco, 200,000,000 pounds a year being smoked and chewed by Americans. We do not, however, use so much per capita as Belgium, Switzerland, the Netherlands, or Germany. The United States is behind Great Britain in the use of rice and wheat. In the consumption of beverages there is a marked divergence. Great Britain drinks more tea than any other country; also more beer. Spain leads in the consumption of wine. Of these the United States uses enough, however, her consumption of tea being 110,000,000 pounds, 725,000,000 gallons of coffee, 1,550,000,000 gallons of beer and 38,000,000 gallons of wine.

## AGRICULTURE.

### HOME MIXING.

Correspondence of The Progressive Farmer. The sampling agent of the Vermont Station visited 105 towns and procured 495 samples of fertilizers found on sale in that State by dealers. These covered 126 different brands produced by 18 factories. The analyses of these samples are given in bulletin No. 65 of Vermont Station, of which the following is a summary: The station has analyzed samples of 126 brands, the output of 18 companies,

all drawn from dealers' stocks, all this year's goods. Three quarters of the total number were above guarantee in every respect, nine tenths were essentially equal to or better than guarantee and all afforded the commercial equivalent of their guarantees. Thirteen brands fell short in one ingredient and two were lacking in two ingredients. In either case were both ingredients seriously deficient. The application of pepsin digestion and alkaline permanganate distillation methods to the several brands indicated that the quality of the organic nitrogen of about a dozen brands, notably the output of two concerns, was somewhat questionable. One hundred and five brands were guaranteed (directly or inferentially) to contain potash as sulphate, a claim which was verified in but 19 cases.

The average "valuation" was found to be \$17.45, and the average selling price \$29.04. Two dollars out of every five invested in fertilizers paid for costs of manufacture and sale. A dollar spent for average low priced goods (below \$28 per ton) bought 53 cents worth plant food; a dollar invested in average medium grade brands \$28 to \$32 per ton, 60 cents worth; and a dollar paid out for average high priced goods (\$32.50 and upward), 67 cents worth. A dollar bought 79 cents worth of plant food in one brand and but 39 cents worth in another. A fifth of the entire number of brands sold furnished less than 55 cents worth of plant food for a dollar.

The average composition of the goods has not varied materially from that of last year. Selling prices are the same, plant food in mixed goods is as cheap as it ever was, but owing to the low prices of raw materials the practice of home mixing is proportionately more profitable now than hitherto. Home mixtures made in this State furnished from 30 to 50 per cent. more plant food at the same cost than did average manufacturers' mixtures.

It may not be amiss to describe briefly the process of home mixing. A tight barn floor, platform scales, screen, shovel and hoe comprise the outfit. The materials being weighed, screened and lumps pulverized, the most bulky goods (usually the acid phosphate) are spread in an oblong pile from 6 to 12 inches deep. Upon its leveled top are placed one above another the other ingredients, the resulting pile resembling a layer cake. The pile is then mixed by careful shoveling, the shovel cutting down through all layers each time. The pile may then be screened again and the operation thrice repeated. The mixture may then be screened again if desired.

At present prices for crude stock and for mixed goods the intelligent farmer who uses a ton or more yearly, by buying and mixing nitrate of soda, cotton seed meal, acid phosphate and muriate of potash, can save money and be assured of as good a fertilizer as can be made. The station stands ever ready to aid and advise inquirers on this as well as on any matter connected with agriculture.

Those who prefer to buy mixed goods rather than raw materials, might well combine and buy fertilizers of specified composition made from standard crude stock on competitive bidding by manufacturers. This method of purchase is largely in vogue in some localities and is decidedly preferable to that commonly practiced.

Vermont farmers seldom think of cotton seed meal as a fertilizer, yet hundreds of thousands of tons are thus used yearly in the South and large quantities even in New England. It is undoubtedly better to feed it to stock in moderate quantities, enriching both ration and manure, thus getting two returns for one expenditure. But where more nitrogen is needed than the manure pile supplies, it is safe to say that at the prices ruling during the past few years, no cheaper source of readily available organic nitrogen has been offered in small quantities in our markets than in cotton seed meal. The schedule of trade values used by this as well as other New England stations allows 14 cents a pound for organic nitrogen at the seaboard. It has cost this year on the average in cotton seed meal delivered in Vermont but 13 cents a pound.

The potash salts are all products of mines located at or near Stassfurt, Germany. The muriate and high grade sulphate are refined and concentrated, while kainit is a crude salt.

For tobacco, sugar beets and some times for potatoes, one should choose

sulphate; for other crops the cheaper muriate is usually as satisfactory. It is doubtful whether the other salts in kainit compensate for the high cost of potash.

Wood ashes are used quite largely on the east side of the State, particularly in the Connecticut valley. Considered as a source of potash only, they are expensive goods at ruling prices. It should be remembered, however, that the good results often obtained by their use are quite as apt to be due to their mechanical effect upon the soil, or to their lime content, as to the potash they contain. All ashes contain carbonate of lime, which, unless they are seriously adulterated by sand and earth, is usually not so variable in its percentage as is the potash. In fifty of fifty nine samples reported on by the Connecticut station for the past three years, the lime averaged 33 per cent.

On the subject of home mixing, the Ohio station, in Bulletin No. 94 advises home mixing by using tankage as a source of nitrogen, and phosphates as a source of phosphoric acid, and muriate of potash as a source of potash, except on a few such crops as sugar beets and tobacco, which require sulphate of potash.

Since these materials are already in condition for use, requiring simply to be stirred together, if any mixing is desired, the acid phosphate being a dry powder, already acidulated; the tankage, a dry meal requiring no further treatment, and the muriate of potash, a dry salt, there is no reason why farmers should not club together, buy the materials by the carload, and mix them together at home, thus saving a large item of cost; and, in fact, "home mixing associations" are being organized over the State for the purpose of effecting this saving. One such association will use 800 tons this season, reducing by several thousand dollars the cost of its members' fertilizer bills.

In elaborate experiments at the Ohio station, potatoes gave a better return for fertilizers used than any other farm crop, wheat standing next; but save in exceptional years, that station has found the use of commercial fertilizers unprofitable on farm crops. It takes high priced crops like garden truck or berries to pay good profits on this class of fertilizers. For farm crops, stable manure and clover are the only profitable manures.

As to the comparative virtues of different fertilizer ingredients, this Ohio bulletin says:

"The results of these experiments apparently justify the conclusion that, for the soils and crops under test, phosphoric acid is at present the most important constituent of a fertilizer, with nitrogen and potash following in the order named.

"The largest increase is only obtained when the fertilizer contains all three of these constituents; but it does not as yet seem necessary to use nitrogen and potash in so large proportion, relative to phosphoric acid, as would be indicated by the chemical composition of the crops.

"Apparently phosphoric acid should considerably exceed either nitrogen or potash in quantity in a fertilizer for corn, oats or potatoes, while for wheat the proportion of nitrogen may closely approximate that of phosphoric acid.

"Nitrate of soda is apparently the most effective carrier of nitrogen in common use as a fertilizer, but it can seldom be used with economy in Ohio because of the relatively high cost of its nitrogen.

"Slaughter house tankage, which is the carrier of 'ammonia' in practically all the factory mixed fertilizers sold in this State, is probably a less effective carrier of nitrogen than nitrate of soda; but the cost of nitrogen in unmixed tankage, when due allowance is made for phosphoric acid carried by the tankage is so much less than in nitrate of soda that tankage becomes a much more economical source of nitrogen to the Ohio farmer than nitrate of soda. This advantage in tankage disappears, however, when it is purchased in the ordinary factory-mixed fertilizer, since the price at which such fertilizers are generally sold brings the cost of their nitrogen to a higher figure than its necessary cost in nitrate of soda, while the experiments reported in Bulletin 93 of this station indicates that the nitrogen of the factory mixed fertilizer is not more effective than that of ordinary tankage.

"Dissolved bone black is apparently a more effective carrier of phosphoric acid than raw bone meal or acid phosphate; but dissolved bone black, like

nitrate of soda, is seldom or never used in the compounding of factory-mixed fertilizers in Ohio, because of the lower cost of phosphoric acid in other materials.

"Acid phosphate, on account of its comparative cheapness and large supply, has become the standard carrier of fertilizer phosphoric acid. Our experiments indicate that commercial acid phosphate, like slaughter house tankage, is variable in composition, and both materials should only be bought on a guaranteed analysis.

"Our experiments fully support the inference that the phosphoric acid of bone meal and tankage, when these materials are finely ground, is quite as effective, pound for pound, as the 'available' phosphoric acid of acid phosphate, and that these materials, unlike bone black and Carolina rock, require no treatment with sulphuric acid to make their phosphoric acid available, provided only the grinding be done with sufficient thoroughness. Investigations reported in bulletin 93 indicate that there has been a decided improvement in grinding within recent years.

"Basic slag appears to stand next to dissolved bone black in effectiveness as a carrier of phosphoric acid. Apparently this result is in part at least due to the superior mechanical condition of the slag meal, as it is an extremely fine powder. This material is not treated with acid.

"These experiments show that the fertilizing constituents of barnyard manure act more slowly than those of commercial fertilizers, but as they cost much less in manure it becomes the cheapest fertilizer.

"The advantage of applying manure to the surface, instead of plowing it under, is strikingly shown."

J. L. LADD.  
Bay City, Texas.

## JUST A FEW THOUGHTS.

Correspondence of The Progressive Farmer.

As a mass, the farmers have the best brain of any class of business men, but the difference comes in the farmer's failure to use his brain about every detail of his business. All farmers should take and read works on proper land culture, but there seems to be a dislike for newspaper farming. Then the farmer should write much for his paper on farming matters. By so doing he himself would soon be a better farmer. The farmer does think, but it is either too late or too soon. There is a proper time for thinking. Another suggestion: Undertake less and you will do more by thorough culture. Have your dump cart and a place of deposit for any and all kinds of trash, leaves, muck, suds and waste that may be turned into land food.

R. R. MOORE.  
Greensboro, N. C., Feb. 1899.

## EXPERIENCE WITH HOME-MIXED FERTILIZERS.

A Practical Farmer Who is Done With the One-crop System Gives Some Valuable Hints—Why do Tar heel Townspeople Eat Northern Cabbage and Potatoes?

Correspondence of The Progressive Farmer. We will take this opportunity of giving our plans and experiments with fertilizers, how applied and with profits derived, etc. I hope to hear from many of your readers on this point. Exchanging plans and ideas in all work with which our farmers are connected will be a mutual benefit.

The best guano for the money that we use is obtained by purchasing the chemicals and mixing them ourselves. We buy ordinary phosphates (acid phosphate) containing 12 per cent. acid, nitrate of soda 18 per cent. ammonia and muriate of potash 50 per cent. K<sub>2</sub>O (pure potash) from an importer. We should be very particular to buy the ingredients from first hands if possible. Will cost from \$5 to \$10 per ton less, also less liable to be adulterated. If bought from an importer in the original bags they will contain of potash 224 pounds nitrate of soda, 305 pounds Nitrate of soda is found in vast quantities in the northern part of Chili, South America.

This bed of nitrate, or "calchi," as it is called in Chili, before it is refined, extends about 150 miles in length and about 20 miles wide, and is in a rain less region.

Some years Chili exports over one million tons (2,240 lbs each) of nitrate of soda, thus sending it to almost every nation on the globe. This great mountain of plant food has been stored away for ages and ages to be used by the people of this century in furnishing

their crops with the necessary nitrogen when the natural supply in the soil has become deficient. Just so the same wise Providence has stored up the coal in the mountains of Pennsylvania to furnish fuel for the people of the United States when their supply of wood had become exhausted.

Potash is mined in Stassfurt, Germany. These mines—nine in number—are consolidated and form the largest and almost the only mines of this kind in the world. The value of potash in these mines was not known until 1857 (before this time wood ashes were the only source of potash). About this time came the skilled researches and discoveries of that great scientist Liebig. By him and his influence the secrets of plant food and plant growth became known, and it was discovered that potash was one of the ingredients which is both important and necessary to the sustenance of plant life. We are also indebted to this noted scientist for the four elementary laws which are the foundation of the best practices in agriculture to day.

Potash, as we have stated before, is imported in 224 pound bags and sealed. When bought the seal unbroken gives us a guarantee that it is pure unless adulterated at the mine, which is not probable.

Some years ago our State Chemist, on analyzing some chemicals of this kind, states he found 50 per cent. to be common salt.

To make one ton guano for potatoes, onions, etc., we mix the following, viz: 800 pounds acid phosphate (containing 12 per cent. acid), 600 pounds cotton seed meal and 300 pounds each of nitrate of soda (18 per cent. ammonia) and muriate potash (50 per cent. K<sub>2</sub>O—pure potash). Cotton seed meal shows per analysis to be an excellent fertilizer. It contains 8 per cent. ammonia, 1 1/2 per cent. potash and 2 per cent. acid phosphate, and if this analysis be true, it is worth for fertilizer \$1 1/2 per hundred pounds. Can be purchased in open market now for less than \$1 per cwt.)

The above formula as given will make one ton fertilizer containing 6 per cent. ammonia, 6 per cent. acid phosphate and 8 per cent. potash. This will cost before mixing \$25.50. Ordinarily this will cost from dealers about \$35 per ton. In the spring of '97 we applied guano similar in ingredients to the above and at the rate of 1,600 pounds to the acre with excellent results. Put 800 pounds of this fertilizer on one half acre and planted to potatoes on March 5th, and in just three months, on June 5th, sold the first load of potatoes; harvested balance in a few days, all of which brought \$59.50. The entire cost of production, including land rent, wear of tools, labor, etc., was \$19.50; this left us a net profit of \$40 for one crop on one-half acre.

In 1896 we put 1 1/2 acres in tobacco, the entire cost was \$50.50; in about 12 months after we started the crop, it was put on the market and brought \$40. This was a very good average tobacco for this vicinity. I decided that it was very foolish to grow a crop over the price of which I had no control and had no "earthly" use for except for fertilizer, boils, spider bites, etc. When I realized my loss then I made a "sour grape" case case of it and decided that its benefit to the human race was very limited indeed, and on the other hand costing more than our bread bill. I am not as hard on it as the brother who said to me one day: "The preacher who chews his long cut and smokes his fine cigars can't pocket my dimes."

However, we think the best method of applying fertilizer for potatoes would be to put 600 to 800 pounds per acre of potash mixture containing about equal per cent. of each potash and acid on peas (1 1/2 bushels per acre) the year before you intend to put land in potatoes. This has given me excellent results. The peas furnish the required nitrogen for their own growth and also for succeeding crops. Nitrogen, if bought, costs three times as much as either phosphates or potash. Hence it is much cheaper to get it through cowpeas, clover, vetch, etc. If, however, necessary for fertilizer to be applied direct to any crop, the potato crop, however, will, with good cultivation, pay well. A bushel of potatoes contain only 12 pounds dry matter, and yet a bushel of potatoes is often sold for as much as a bushel of wheat, which requires about four times that amount of plant food to produce. The average price we received through

[CONTINUED ON PAGE 8.]