VACCINATING THE GROUND.

The Wonderful New Discovery Enabling the Farmes to Do Away With Nitrogen Fertilizers.

By Raymond Porter, Autnor of "A Seventy-five-thousand-pound Meteorite," etc.

This article has been revised by and has received the approval of the United States Department of Agriculture.

The up-to-date farmer no longer spends hundreds of dollars annually in buying fertilizers for his acres. Instead, he sends to the Department of Agriculture in Washington and receives a little package of bacteria and with these he vaccinates his soil, enables his plants to draw their nitrogen from the air instead of from the ground, and increases his crops from 100 to 1000 per cent.

What this invention means in dollars and cents to the country at large and to the farmer in particular is something almost beyond computation. Imagine each acre of wheat and each acre of potatoes, following a crop of inoculated legumes, producing as many bushels as two acres formerly produced. Imagine each acre of peas, of beans, of clover, of vetch and of alfalfa producing as much as ten acres formerly produced. Imagine the increase in the income of the farmer. Imagine the decrease in the price of food stuffs for the general consumer. Imagine thousands upon thousands of acres that have been abandoned because of "worked out" soil, that now may be worked at a profit far greater than ever.

Nothing experimentative remains about the application of these bacteria. The invention is settled and practicable beyond dispute, for, the United States Agricultural Department itself says so. Farmers throughout sections in the entire land have experimented with the bacteria during the past two years and the results have proved simply marvelous. From two to twenty-fold crops have been grown on these vaccinated lands. Worthless, barren ground, literally too poor to grow weeds, has been vaccinated and made to produce crops four times as large as those taken from the average unvaccinated soils. Here are a few specific instances:

A field of poor ground was divided into halves, and one of the halves was vaccinated by the new method. The untreated half of the field produced only 200 pounds of clover to the acre. The inoculated field produced 2000 pounds to the acre.

Similarly, two fields of vetch were experimented with, the untreated patch yielding 581 pounds and the treated patch 4501 pounds to the acre, or an average increase of almost 8 per cent—a single vaccinated acre producing as much as eight unvaccinated acres.

Again, adjacent fields were treated and left untreated, the soils producing respectively 6292 and 372 pounds of crimson clover to the acre. In other words, the vaccination repaid very nearly $20 for $1.

A Maryland farmer who had been obliged to abandon two-thirds of his farm because it was "worked out," increased his output 500 per cent, simply by vaccinating his soils. Scores of similarly abandoned farms were reclaimed.

To understand the simple principle of this revolution in agriculture it is necessary only to bear in mind that nitrogen is one of the chief foods of plants. Potash, iron, etc., a plant must have to thrive, but nitrogen is one of the most important of all the elements in plant diet.

Orlinarily, plants take their nitrogen out of the ground through the medium of their roots, and each successive crop draws on the nitrogen supply of the soil, so that, unless the drain is balanced by putting back just so much of the valuable food, the ground will become lean and poor and, eventually, useless. Up to now, the method of putting back the nitrogen exhausted by the crops has been by using fertilizers. Every fall and spring the farmer carted hundreds upon hundreds of loads of costly manure, spreading it with untold labor. Guano he spread, and expensive fertilizers costing from $30 to $75 a ton. He even had to scatter nitrate of soda (saltpeter) shipped more than a thousand miles, all the way from Chile. In fact, so absolutely necessary were these soil invigorators and so extensively had they to be used that today practically all the guano beds of the world have been exhausted, and the visible supply of saltpeter is so limited that, according to the present rate of consumption, it can last no longer than fifty years; after which, according to science, scarcity of crops and —Famine.

And now, in the nick of time, along comes a tiny, invisible, friendly germ, offering to work for us free of charge and to supply nitrogen as quickly as our crops can use it up, if only we will treat him half-way decently.

How the Discovery Was Made.

From earliest times it has been recognized that most exhausted soils, if permitted to rest for a few seasons, would regain their fertility. Only comparatively recently, however, was it learned that what enriches these soils is a form of soil bacteria which has the faculty of drawing nitrogen from the surrounding air and, by storing it up, rendering it availible for plant food. Also, ever since the time of Pliny it has been known that the leguminous, or pod-bearing plants, like peas, beans, clover, etc., did not require the same amount of fertilizer necessary for other plants. More, these plants, instead of drawing from the soil, actually enriched it by taking an excess of nitrogen from the air and storing it up in the ground for the benefit of other kinds of crops. This is what gave rise to the modern method of rotating crops, although why the legumnious and not the other plants should have this faculty, was a mystery. It was never suspected that these pod-bearing plants had a particular attraction for the soil bacteria, and that here they congregated in such numbers that they might readily be procured. It had been noticed that the roots of these legumes grew numbers of nodules, varying in size from a pin-head to a potato, but these were supposed to be due to bites from worms and insects. Not until the German Professor Nobbe brought tubercles under the microscope was it found that they were literally alive with soil bacteria.

To isolate, to breed and to colonize these nitrogen-fixing germs so that they might be shipped to all quarters of the globe was the problem, and the Professor succeeded in part. He produced what he called "Nitragin," which was widely advertised and sold enormously. But, although there were instances of phenomenal success, on the whole Nitragin was a deplorable failure.

It was at this point that Dr. George T. Moore, in charge of the Laboratory of Plant Physiology, Department of Agriculture, took up the invention and made it practicable. To these minute, invisible organisms he applied a rule which holds for the higher animals. He decided that the German Professor had gone too far by being too good to his germs. At the outset, the professor had given his bacteria too much nitrogen and they never learned to gather it for themselves, but died no sooner their original portion was exhausted.

Dr. Moore treated his germs just as a wise father treats his son. He did not surfeit them with the good things of life. He gave them just enough nitrogen to make them want more, and gradually they learned to hunt it for themselves and to hunt up enough for themselves and to spare. In fact, so active were these bacteria when turned out of the laboratory that seeds soaked in the germ solution sprouted and grew luxuriantly in quartz sand which had been heated red previously in order to drive off the last traces of nitrates.

With this success phenomenally established, it remained merely to enable the cultures to be distributed in sufficient quantity to become of practical use. It was found that when these bacteria were grown on nitrogen-free medica they retained their high activity, providing they were carefully dried out and revived in a liquid at the end of varying lengths of time. By using an absorbent, like cotton, which will absorb millions of tubercle-forming bacteria these could be shipped to any part of the United States and arrive in perfect condition, ready to be revived in water and to be cultivated into untold billions by the simple addition of certain nutrient salts. Thus, by sending out a dry culture no larger than an yeast cake, the bacteria might be multiplied sufficiently to inoculate at least an acre of land. In fact, the amount of material thus obtained is limited only by the quantity of the nutrient water solution, and it must be evident that the cost of inoculating land is so very small that it is absolutely infinitesimal when compared with the very large increase in returns from soil so treated.

Directions for Using Inoculating Material.

The inoculating material is sent to the farmer by the Government for experimental purposes in three packages. The first of these contains the cotton penetrated with millions of the dried germs. The first and the third packages are the media of food by which the farmer can multiply the germs, the entire procedure, according to the department's directions, being as follows:

"Put one gallon of water, preferably rainwater, in a clean tub or bucket and add No. 1 of the packages of salts—containing granulated sugar, potassium phosphate, and magnesium sulphate. Stir occasionally until dissolved.

"Carefully open package No. 2—containing bacteria—and drop the enclosed cotton into the solution. Cover the tub with a paper to protect from dust and set aside in a warm place for twenty-four hours. Do not heat the solution or you will kill the bacteria—it should never be warmer than blood-heat.

"After twenty-four hours, add the contents of package No. 3—containing ammonium sulphate. Within twenty hours more the solution will have a cloudy appearance and is ready for use.

To Inoculate Seeds.

"Take just enough of the solution thoroughly to moisten the seeds. Stir thoroughly so that all seeds are touched by the solution. Spread out the seeds in a shady place until they are perfectly dry, and plant at the usual time just as you would untreated seed. The dry cultures as sent from the laboratory will keep for several months. Do not prepare the liquid culture more than two or three days previous to the time when the seeds are to be treated, as, once the solution has been made, it must be used up within forty-eight hours.

To Inoculate Soil.

"Take enough dry earth, so that the solution will merely moisten it. Mix thoroughly so that all the particles of the soil are moistened. Mix this earth with four or five times as much untreated earth. Spread this inoculated earth thinly and evenly over the field exactly as if spreading fertilizer. This should be done before plowing, or else the inoculated seed should be harrowed in immediately.

"Either of the above methods may be used, as may be most convenient."

But the nitrogen-fixing bacteria work still other wonders, for they are not of use merely for the purposes of raising leguminous crops. Already it has been told how the legumes enrich the soil by bringing back nitrogen to it. The identical bacteria that increase the harvest of these plants tenfold and more, enable them to store infinitely more nitrogen in the soil than would ordinarily be the case. In short, the bacteria increase the leguminous crops tenfold, and the leguminous crops are proportionately more active in enriching the soil. A crop of uninoculated crimson clover adds 4.3 pounds of nitrogen to an acre. A crop of inoculated crimson clover adds 143.7 pounds.

At the foot of this article is printed a table illustrating in figures the value of soil vaccination.

It is impossible to foretell how much the invention of Dr. Moore will increase the crops of the United States, or those of the world—for the bacteria are applicable without regard to climate or country. In the opinion of agricultural scientists, not in the history of the Department of Agriculture has there been a more promising development.

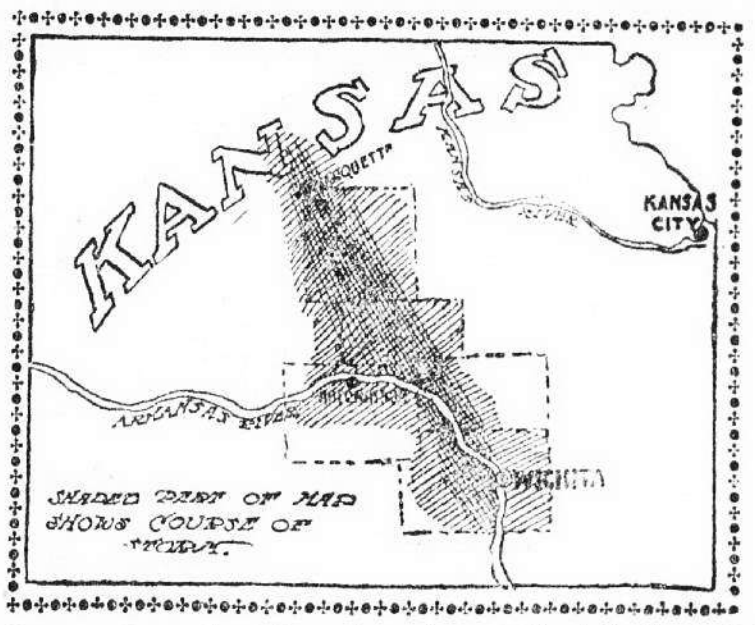
	Original Yield per Acre.
Cotton	932. pounds
Potatoes	67.8 bushels
Oats	8.4 bushels
Rye	4.5 bushels
Wheat	18.6 bushels

Yield Per Acre After Inoculated Crop.

After red clover	1304. pounds
After crimson clover	102.2 bushels
After velvet beans	33.6 bushels
After peas	23.5 bushels
After melilotus	26.9 bushels

Gain in Weight.	Gain in Value.	Per Cent of Gain.
372. pounds	$44.64	40 per cent.
34.4 bushels	15.	50 per cent.
25.2 bushels	9.	300 per cent.
19. bushels	9.85	400 per cent.
8.3 bushels	6.50	46 per cent.

PROSPEROUS SECTION OF KANSAS SWEPT BY DEADLY TORNADO



Marquette, Kan., suffered the worst from the storm. In the town and immediate vicinity twenty-nine were killed and more than 100 more or less injured.

The tornado threw the town into a panic, wrecked scores of buildings and did much damage in the country near by. Many of the victims were killed as they lay asleep; others awoke, maimed and bleeding, to find themselves buried in the ruins of their homes. Rescuers worked with lanterns for several hours, caring for the sufferers.

The storm swept a clean swath 100 yards wide through the town, destroying the Methodist and Lutheran churches the opera house and many dwellings.

THE PACE THAT KILLS.

Physician's Arraignment of Our Modern Society.

Physicians in New York have been startled by the alarming increase in the number of sudden deaths due chiefly to heart disease. Dr. Girdner, author of "New Yorkitis," makes a short-cut to the real cause of this mortality when he says: "New Yorkers are driving themselves like beasts of burden. They are working like dynamos all day, and playing like idiots at night." To use an old phrase, they are going "the pace that kills."

We cannot lead the strenuous life without paying for it. We may work too hard, eat too fast, play irrationally, sleep too little if we wish; but nature demands its equivalent. Nervous strain means a weakened heart and other organic troubles—often a sudden death. And all for what? Merely to excel someone else in money getting or in climbing the social ladder.

If a man must work like a dynamo all day he ought not to be an idiot at night. And if he plays the idiot socially he should not be a business dynamo. He may stand one or the other and die from old age; but if he tries them both it won't be long before something will break. The dynamo may burn out or the idiocy become permanent.

The fact that we are living too fast—for New York has no monopoly on the strenuous life—is not deduced from sudden deaths alone. Nervous strain means accidents, suicide, sometimes even murder.

Is the game worth the candle? Is any fortune or social position that man can attain compensation for a combination of dynamo and idiot? "What shall it profit a man if he gain the whole world and lose his own soul?"—Chicago Post.

HEAD OF IMPORTANT BUREAU

Recent Appointment Is Promotion for William C. Fox.

The appointment of William C. Fox to the directorship of the bureau of American republics, to fill the vacancy made by the appointment of W. W. Rockhill as United States minister to China, has been announced. Mr. Fox has been with the bureau since 1898, prior to which time he was consul at

Brunswick, Germany, for thirteen years, being appointed by President Grant.

Nurses Worn-Out Horses.

The princess of Wied, who is a prominent figure in the court circle at Berlin and whose husband is in the line of succession to the throne of Holland, has developed a curious but humane hobby, in which only one of her great wealth could indulge. She buys all the ill-used horses that come to her notice and gives them the benefit of a stay in her well-appointed stables. A period of rest and kind treatment usually restores the unfortunate animals to good condition and puts them in working order again. Hundreds of broken-down horses have enjoyed the princess' hospitality and have left the equine sanitarium "as good as new"

BRANDEGEE GOES TO SENATE

Successor to Late O. H. Platt of Connecticut.

Congressman Frank B. Brandegee, who has been chosen to succeed the late Senator O. H. Platt in the United States senate, represents the Third Connecticut district in the national house of representatives. He is a Yale graduate, and while at Yale pulled the bow oar in the varsity boat crew. He was elected to the legislature twelve years ago, and in 1898

was chosen speaker of the Connecticut house. His father had held the same office in the legislature and was congressman during the civil war.

Indifference to War's Horrors.

It would take a psychologist to explain why all the world shudders at the blotting out of St. Pierre or the drowning out of a Johnstown—and gladly puts its hand in its purse in order to aid the survivors, while today it regards the far greater loss of life in Manchuria with comparative equanimity—the excuse for a few banal remarks. Let natural forces but triumph over and destroy a few thousand human beings and everybody groans. But if your supposedly civilized nations set their hundreds of thousands to smashing of skulls, blowing each other to pieces and wholesale maiming we merely speculate as to whether the losses are proportionately greater than in other battles, or whether this is the largest slaughter of men on record, and even bet on the exact date when Harbin is likely to fall. Why this distinction when it comes to the taking of human life en masse.—New York Evening Post.

Children of the Slums.

Their chances of existence are small in the midst of the unsanitary horrors of the slums; their chances of a happy, healthy childhood and a successful, honorable future are almost nil. But they are coming into the world by thousands; the people who have the most excuse for race suicide have ever the least inclination toward it. In the slums the children swarm; they die like flies or live worse than beasts, shut up in festering hotbeds of misery, disease and crime. And God's great, generous acres, where they might thrive and grow well and sweet and beautiful and strong, lie barren and deserted in the sunshine—often held by land-grabbers, who gained them by fraud. To bring them together—these landless children and these childless lands—would be a work to immortalize any millionaire alive.—Cleveland Leader.

Soldiers of Various Nations.

Of all great nations the United States of America have in their peace-time standing army the smallest number of soldiers in proportion to extent of population, namely, one soldier to every 1,000 citizens. The opposite extreme, curiously enough, is reached by another republic—France—which has one soldier for every seventy-two of its population. Italy has one soldier to every 100 subjects; Germany, one to 107; Austro-Hungary, one to 125, and Great Britain, one soldier to every 225 subjects. Belgium, having a population of not more than 7,000,000, has one soldier to every 130 inhabitants. Russia has one soldier to every 140 of its subjects; Japan, one to 350.

LOUISIANA NEWS.

Book Depositories at New Orleans.

Baton Rouge, La.: The four general depositories for the distribution of the uniform text books adopted for use in the public schools of Louisiana will be located at New Orleans, Shreveport, Alexandria and Monroe, and will be maintained for four years. This was decided after J. B. Aswell, state superintendent of education, requested an opinion from each member of the state board of education, the majority agreeing upon the cities named. In the past only two general depositories have been maintained, both in New Orleans. In addition to these four general depositories, the law provides that each parish in the state shall have not less than one nor more than four local depositories. This law does not mean that the publishing houses cannot maintain more than four depositories in a parish, but means that they cannot be compelled to maintain more than four. In some of the larger parishes more than four depositories are maintained. The contracts for these depositories are made by the publishing houses with the local dealers in the various parishes. The parish superintendents of education are now filing with the state superintendent information as to the number of local depositories that will be required in their respective parishes. This information will be forwarded at an early date to the publishers, and they will act upon it in making arrangements for the distribution of their books.

Southern Pacific Employes.

Houma, La.: The excursion given for the benefit of the Southern Pacific employes reached here Friday morning in three sections. There were about 3000 men, ladies and children on the trains, with four brass bands. The excursionists were scattered throughout the town, but the greater portion made their headquarters at Suthron's Park, where games of baseball were arranged for the afternoon. Braun's Naval Band discoursed music in the pavilion at Court Square, where a good many of the excursionists gathered under the oaks. The excursion was gotten up solely for the Southern Pacific employes and their families, in order to give them an outing free of any cost and expense, except the actual cost of running the trains.

Recommends High License.

Houma, La.: The grand jury impaneled for the May session of the District Court has made its final report. The opinion is expressed that the indiscriminate use of liquors is the cause of much crime, and higher license is recommended for the town of Houma and parish. The police jury and town officials of Houma are entreated to give the matter their serious attention. The report also comments on the matter of certain sugar refineries allowing slops and acids to flow into the natural streams of the parish, and asks that this practice be stopped at once. The following true bills were presented: Shooting with intent to murder, 3; violating oyster law, 14; larceny, 4; murder 4; burglary, 1; assault with a dangerous weapon, 1; afflicting wound less than mayhem, 1; assault by wilfully shooting at, 1; Harry Guidry, who shot and killed two young sons of Theopile Desroche some time ago while they were asleep in bed, was indicted for murder. It is alleged that Guidry is insane.

Naval Cadet Appointed.

Alexandria, La.: Peter Schnack, son of C. A. Schnack, has received, through Hon. A. P. Pujo, congressman from the Seventh district, appointment as cadet in the Annapolis Naval Academy.

Mayor Andrew Querbes and Aldermen S. A. Dickson and R. C. Friend, of Shreveport, were the guests of Alexandria last week, and were conducted over the city by Mayor Turner and Alderman and Secretary of the Progressive Union H. B. Chase. The Shreveport officials were here to inspect the city's electric lighting and waterworks systems, which are owned and operated by the city. Shreveport is contemplating municipal ownership of her water and lighting plans.

In order to get right of way on public roads outside the city limits the electric street railway promoters have asked the police jury for that privilege and a meeting of the jury has been called for Thursday, May 18.

Welsh, La.: An unknown negro was killed here Friday night by one of the freight trains. His body was found near the stockyards about 11 p. m. His head was crushed and one arm and one leg were broken. The supposition is that he was stealing a ride on the bumpers and fell between the wheels, causing instant death.

Thieves Rob Grocery.

Boutte, La.: Thieves Friday night broke open Sellers & Young's grocery store and stole the cash drawer, which contained about $18. They did not touch anything else. They gained an entrance by forcing a bedroom window back of the store, which is opposite the Southern Pacific depot.

Prisoners Sentenced.

Donaldsonville, La.: The last day of the Criminal Court was taken up in the sentencing of prisoners who were convicted to serve terms in the penitentiary. John Richardson, for embezzlement, was given 1 year; Johnson Washington, manslaughter, 5 years and a fine of $10; Walter Russell, murder, imprisonment for life. In the case of Dominique Savoja, who was convicted of buying goods on credit and selling them out of the ordinary course of business, sentence was suspended and the accused released under a $200 bond. Court then adjourned sine die.

Fufkin Victims Will Rebuild.

Lufkin, Texas: The fire of Friday night threw about thirty men out of work. We learn that Cook Bros., Kerr and Fox will shortly rebuild and larger and more up-to-date houses.

International Pay-Day.

Taylor, Texas: Yesterday was payday for the employes of the International & Great Northern railway at this place. The monthly payroll of this company now amounts to between $7,000 or $8,000, or about $100,000 annually.

San Antonio Pigeons Released.

Taylor, Texas: Two hundred and sixty-two homing pigeons shipped here from San Antonio were at 7:32 o'clock this morning turned loose by Express Agent Strom, C. F. Gilstrap and E. Riddle. When liberated the birds made a beautiful start for their Western home.

Cuero, Texas: A good rain fell here yesterday morning just in the nick of time for potatoes, cantaloupes and cucumbers, which had begun to need it.

El Paso, Texas: A carload of silver dollars, consisting of sixty-nine boxes and containing money to the value of $249,000 gold, passed through this port yesterday en route from Mexico to San Francisco for exportation to China. The silver occupied an entire express car and is said to be the largest exportation of silver dollars ever made from this country.

Temple, Texas: Another severe rain fell here Sunday afternoon, commencing about noon and lasting for 3 hours. An immense amount of water fell during that time.