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THE REAL VALUE OF "NATURAL PLANT FOOD."

L. L. VAN SLYKE.

GENEVA, N. Y.

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Address all correspondence, not to individual members of the staff, but to the NEW YORK AGRICULTURAL EXPERIMENT STATION, GENEVA, N. Y.

The Bulletins published by the Station will be sent free to any farmer applying for them.

*Connected with Long Island Branch Station.

†Connected with Fertilizer Control.

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THE REAL VALUE OF "NATURAL PLANT FOOD."

BY L. L. VAN SLYKE.

Summary.

Within the past year the sale of a material called "Natural Plant Food" has been vigorously pushed among the farmers of this state. Extravagant and misleading claims have been made for its value as a plant-food.

The guaranteed analysis implies, and a specific claim is made that the material is "all available to plants in the soil." Chemical analysis at this Station shows that the materials are mostly in unavailable forms as plant-food. An average of three samples shows the following composition:

Total phosphoric acid.....	22.21	per cent.
Insoluble phosphoric acid.....	20.81	"
Available phosphoric acid.....	1.40	"
Potash soluble in water.....	0.13	"

"Natural Plant Food" is really a mixture of some rock phosphate (probably Florida soft phosphate) with glauconite, a mineral containing potash in an insoluble form, commonly known as "green sand marl."

The selling price of "Natural Plant Food" varies usually from \$25 to \$28 a ton; its real agricultural value as plant-food is probably below \$10 a ton at a liberal estimate.

INTRODUCTION.

For some months past numerous inquiries have been addressed to this Station asking for information in regard to a fertilizing material, the sale of which was being vigorously pushed. The following extract from one of these letters is an indication of the contents of many others: "We are in trouble over this fertilizer and would like to know just what it is. It is sold to the people through here to be genuine fish and bone and it is a complete sell on us all. We paid \$26 to \$28 a ton for it and my crop was just as good where nothing was used." The parties selling this material have been so aggressive, so many misleading statements have been made by them to purchasers, and so many farmers appear to have been imposed upon through the misrepresentations made, that the circumstances appear to demand at this time an authoritative statement from us, in order that the farmers may be fully informed in regard to this material and be placed upon their guard against further misrepresentations.

"Natural Plant Food."

The material referred to is sold under the name of "Natural Plant Food" by the Natural Plant Food Company, 35 B St., Washington, D. C. The advertising circulars which are sent out are filled with extravagant claims and testimonials in praise of the wonderful fertilizing value of this material. The following statement affords an illustration of the claims made: "Natural Plant Food. This is the best fertilizer on the market. There have been many official tests made with it and it always came out ahead of all competitors, having produced the largest crops of all. Being a natural fertilizer, it is equally good on all crops."

Misleading Character of Guarantee-Analysis.

The guaranteed analysis of this "Natural Plant Food" is thoroughly and ingeniously misleading. The following is a

copy of one of the forms in which the guaranteed composition is expressed:

"Phosphoric Acid. Total (P ₂ O ₅).....	21.60 to 29.49	per cent.
Eq. to Bone Phos. of Lime.....	47.20 to 64.38	"
Potash (K ₂ O) (From Glaucanite).....	1.00 to 2.00	"
Eq. to common Sulphate of Potash.....	2.00 to 4.00	"
Silicic Acid (Si O ₂).....	5.26 to 8.10	"
Carbonic Acid (C O ₂).....	2.07 to 3.00	"
Lime (CaO).....	29.16 to 32.00	"
Magnesia (Mg O) and Soda (Na ₂ O).....	3.21 to 8.05	"
Aluminic (Al ₂ O ₃) and Ferric (Fe ₂ O ₃) Oxides...	5.14 to 10.26	"

ALL AVAILABLE TO PLANTS IN THE SOIL.

The above are the Lowest and the Average Analyses."

This guaranteed analysis is misleading in the following particulars :

1st. It guarantees to be present constituents which have no market value as fertilizers, such as silicic acid, carbonic acid, etc., leading the average farmer to believe that these constituents are as valuable as potash and phosphoric acid.

2nd. It states that the total phosphoric acid is *equal to* 47.20 to 64.38 per cent. of *bone phosphate of lime*. This statement is made for the specific purpose of representing to farmers that the phosphoric acid is as good as the phosphoric acid contained in bone.

3d. It states that the potash present is from glaucanite, the latter in very small type, and adds that it is "equal to common sulphate of potash." Potash in glaucanite is very slowly available while in sulphate of potash it is readily and completely available.

4th. Beneath the guarantee statement appears in capital letters, "all available to plants in the soil." How misleading this assertion is, we can show by the results of our analysis coupled with experimental work done elsewhere.

Analyses of "Natural Plant Food" at this Station.

Our collecting agents secured in May and June three samples, one each in Fayetteville, Gouverneur and Saratoga Springs.

The results of analysis are as follows:

Sample.	Pounds of phosphoric acid in 100 pounds of N. P. F.			Pounds of potash soluble in water—in 100 lbs. of N. P. F.
	Available.	Insoluble.	Total.	
No. 1	2.22	23.87	26.09	0.11
No. 2	0.93	19.60	20.53	0.12
No. 3	1.06	18.96	20.02	0.17
Average	1.40	20.81	22.21	0.13

While the claim is made that "Natural Plant Food" is "all available to plants in the soil," we see that chemical analysis shows that of the phosphoric acid only one to one and one-half per cent. is available, and of the potash only a trace.

Real Character of "Natural Plant Food."

Before considering further points in regard to "Natural Plant Food," we will indicate more clearly what the material is. It is undoubtedly a mixture of soft rock phosphate and the mineral glauconite. This rock phosphate is more commonly known as Florida soft phosphate. So far as experiments have been made, the soft phosphates are entirely inferior to acid phosphates and probably not in any way superior to the form of finely ground phosphate known as floats.

Glauconite, the mineral which furnishes the potash in "Natural Plant Food," contains potash and iron in the insoluble form of silicate. This is more familiar under the name of "green sand marl" of New Jersey. Potash in this form is about as effective on crops as potash in granite, so far as we have evidence.

It is claimed that "Natural Plant Food" has remarkable power as a seed germinator. This claim is made in the following language, which bears a remarkable resemblance to the phraseology so familiar to us in patent-medicine circulars:

"Every intelligent farmer knows that fertilizer is the best which can soonest start the seed to growing and cause the largest number of seeds to sprout and grow, out of the whole number planted. This, the Natural Plant Food has done in every case. The Natural Plant Food makes more seed grow,

out of the whole number planted, than any other fertilizer on earth. It makes these seeds come up much earlier and faster, grow more vigorously, withstand a drouth much longer and finally produce a much better crop than any other grade of fertilizer yet known, as has been fully demonstrated and proven beyond all manner of doubt by tens of thousands of witnesses, to its marvelous germinating and forcing powers. This all goes to show that a *Natural* fertilizer is of vastly more benefit to the soil than an artificial imitation; for, after all, a Chemical or Artificial fertilizer is simply an attempt in an artificial manner, to supply the crops with a chemical mixture which is simply an imitation of a first class Natural fertilizer; surely the Almighty is a better chemist than the human race has yet produced and better knows the need of all growing things."

The Ohio Experiment Station made a test of this matter and they conclude that "the claim made for soft phosphate as a quick germinator is rather rash and that, as a matter of fact, it is inferior to the green house soil without a fertilizer."

The Commissioner of Agriculture of Georgia recently called the attention of the farmers of his state to the sale of soft phosphate under the name "Natural Plant Food," and the following extract is taken from his statement:

"There is a material now being sold in Georgia which is attracting considerable attention on account of the extensive advertising which has been given it and the broad claims which have been made. This material is the soft phosphate of Florida. These phosphates contain only two or three per cent. of available phosphoric acid, and in no way represent the acid phosphates of the market, which contain from thirteen to fourteen per cent. of available phosphoric acid. This material has not been tried sufficiently to demonstrate whether it is in any way superior to ordinary floats.

"These phosphates contain from fifteen per cent. to twenty-seven per cent. of total phosphoric acid. They usually, however, run about twenty per cent. This, its promoters claim, can all be secured by the plant the first season. The evidence thus far has not been of a conclusive nature. The claim certainly appears an unwarranted one, as positive proof is wanting. Acid phosphates of the market usually contain from fourteen to eighteen per cent. of total phosphoric acid, of which from thirteen to sixteen per cent. is available, and the

soft phosphates only about twenty per cent. of total phosphoric acid, with about two and one-half per cent. available. The law of Georgia recognizes, as commercial plant food, available phosphoric acid, and does not so recognize insoluble phosphoric acid. If the farmers of the State desire to try the soft phosphates on their lands the department of agriculture wishes them to do so with their eyes wide open, and on this account has forbidden the sale of this material under a name which indicates that it is of the same character as (acid) phosphates, which it most certainly is not. It more closely approaches in character a finely ground phosphate rock. We have permitted the sale of these soft phosphates under their correct name as 'soft phosphate' just as we would any crude fertilizing material. There has been a special effort made by several parties to secure permission to sell this material, mixed with potash and ammonia, as a complete fertilizer. The sale of such a mixture has always been forbidden, if it contained less than ten per cent. of plant food, as clearly a violation of the State laws. Any material which will furnish plant food to our farmers cheaply will be welcome to us, but many cannot afford to use such unproven materials and will not use them if they are aware of their unproven character; hence we have ruled and insisted that soft phosphates must be sold as 'soft phosphates' and not masqueraded as something else."

Selling Price and Actual Value of "Natural Plant Food."

One other point to which attention should be called is the price at which "Natural Plant Food" is sold. The lowest price reported to us has been \$17, and this was when a farmer bought direct from the company. When sold through dealers, the price has been from \$25 to \$28 a ton. The commercial value of these goods, as based on their composition, would not exceed \$10 a ton, and it is probable that their actual agricultural value is even below this.

It is not probably within the power of this Station to prevent the sale of "Natural Plant Food" in this state through the courts; and the only method of preventing continued imposition upon our farmers is to make the foregoing statement.

Whenever farmers are offered fertilizers of which they have no knowledge, they should secure information from this Station before purchasing such materials.