LEGISLATION ON FERTILIZER ANALYSIS.

BY DR. BRUNO TERNE.

The last report of the New Jersey Agricultural Experimenta Station, stated that the determinations of the available phosphoric acid are made at a temperature not exceeding 100° F., equal to 40° C.

Knowing that the temperature for determination of the available phosphoric acid had been raised to 65° C. or 150° F. several years ago, and not being aware of any exceptions to this rule, I opened a correspondence with some of the leading chemists, both State officials and consulting chemists. The answers of these gentlemen are sent herewith (see Appendix), and give a fair picture of the present state of the determination of reverted phosphoric acid.

It may, perhaps, seem a small matter if a State, as New Jersey, legislates at her own pleasure and does not keep pace with the progress of her neighbors; but when, by such action, the reputations of a large number of manufacturers are jeopardized, it seems to be opportune to call the attention of the public to the fact, and show the unreasonable action of the legislative body of our neighboring State.

According to the letters of the New Brunswick station, since the adoption of the raised standard temperature by the convention of official State chemists, the representative of this State has withdrawn from such convention. We think the agricultural station has done something which had better not been done at all.

The gentlemen of the State institution should either have declared the adoption of a higher temperature to be wrong, and have shown their reason for it, or they should, at the first session of the legislature of the State, after the Atlanta Convention of Agricultural Chemists, have reported to this body that, after new researches, the Convention of State Chemists had adopted a new standard temperature, and, in order to be in concert with all analytical work, begged to amend the fertilizer law accordingly. When Massachusetts had done this very same thing (as the letter of the State chemists shows), could there be any doubt that any intelligent body of legislators would decline to take the advice of the Convention of

Agricultural Chemists? We do not believe it. Therefore, we claim that the station of New Jersey has more seriously hurt the interests of the manufacturers of its own State than those of others. Still manufacturers of the neighboring States of Pennsylvania and New York, who deal extensively with New Jersey, are put in a very peculiar position. They are law-abiding in their own States and yet fall short in another. Now, when we know how difficult it is to get uniformity in the results in determinations under exactly similar circumstances—I refer to Bulletin No. 16, U. S. Department of Agriculture, 1887, pages 36 and 37, where differences of 1.04%, 0.7%, 0.78% in the determination of available phosphoric acid in the samples is shown—what can we expect when the conditions of the analytical work are different; and when to the want of accuracy of the work is added a standard difference of the result, by an arbitrary rule requiring work at different temperatures?

Already, in the AMERICAN CHEMICAL JOURNAL, 1884, Vol. 6, Mr. Thomas P. Gladding has shown what influence the temperature has on the solvent qualities of ammonium citrate solutions, and, mainly on the strength of the researches of Mr. Gladding, the temperature has been raised to 65° C.

The Convention of Official Chemists at Atlanta in 1884 adopted the higher temperature as standard. We, therefore, were of the opinion that the universal standard temperature was also ruling in our neighboring State until we found our error. We tried to find out what difference it will make in mixed fertilizers, dissolved goods.

In our Double Eagle Phosphate we obtained the following results:

	65° C.	40° C.
Total available phosphoric acid.....	7.68	7.04
Insoluble " "	4.80	5.44
Total.....	12.48	12.48

A difference of 0.64%; and in a sample of Am. Phosphate, received from Mr. Gascoyne, Richmond:

	65° C.	40° C.
Total available phosphoric acid.....	8.71	7.63
Insoluble " "	1.72	2.80
Total.....	10.43	10.43

A difference of 1.08%.

If we now calculate their valuation on the basis of each method, we find it to be, per ton, as follows :

FIRST SAMPLE.

	U. S. Method, 65° C.	New Jersey Method, 45° C.
Available phosphoric acid, @ 8c....	$12 98	$11 26
Insoluble " " " 2c....	1 92	2 16
Total value.....	$14 20	$13 42

Difference, 78 cents per ton.

SECOND SAMPLE.

	U. S. Method, 65° C.	New Jersey Method, 45° C.
Available phosphoric acid, @ 8c....	$13 92	$12 20
Insoluble " " " 2c....	68	1 12
Samples of Acid Rocks, Sheet 249.		
Total value.....	$14 60	$13 32

Difference, $1.38 per ton.

SAMPLES OF ACID ROCKS.

	U. S. Method. 65° L.	N. Jersey Method. 40° L.
	P_2O_5	P_2O_5
Total available phosphoric acid....	12.16%	11.52%
Insoluble " "	4.48%	5.12%
Total " "	16.64%	16.64%

Difference, 0.64%.

Valuation per ton; Available phosphoric acid, 8 cts.; insoluble, 3 cts.

Available	$19.45	$18.43
Insoluble.....	2.68	3.06
	$22.13	$21.49

Difference, 0.64 cts. per ton.

If the chemical management of any works outside of the State of New Jersey adds to the first sample, 3% ammonia, the valuation will be, everywhere, $25 per ton; that is to say, its retail price will reach the valuation of the stations, but in New Jersey it will fall short 78 cents per ton. And so, in the second sample, which, by addition of ammonia or potash, may be brought to any desirable standard, the difference in valuation between the other States of the Union and New Jersey will be $1.38 per ton.

What is the consequence of this difference? The New Jersey station controls the fertilizers sold each season in that State. The names of manufacturers are branded with the stigma of undervaluation of their goods, only because the State of New Jersey has not altered her law, and has not enabled her control station to act in concert with all the other agricultural stations of the Union.

It is in itself a foolish attempt to regulate chemical methods of analysis by legislative action, binding the officials of a commonwealth to certain methods, which may be found wanting and be replaced by new and better ones at any moment.

The adjustment, by rule, of the methods of chemical analysis for the regulation of the fertilizer trade should be left to the Convention of Agricultural Chemists, and such methods as are approved by this Convention, from year to year, should be binding upon all interested therein.*

The methods for the analysis of fertilizers, as now adopted, are very far from being faultless, and their incompleteness is the source of continuous research for new or improved methods.

But in justice to the manufacturer, uniformity of methods must at least be claimed. The fair name of any business house, which, in good faith and with continuous scientific control of its products, lives up to the regulation of the Convention, is sacri-

* The rules and regulations for inspection of fertilizers just presented by the Committee of Agriculture, State of Georgia, for 1887-1888, have been made precisely in this way.

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RULES AND REGULATIONS FOR THE INSPECTION OF FERTILIZERS IN GEORGIA, FOR THE SEASON OF 1887-8.

XIV. (p. 6.) The method of analysis recommended by the recent Convention of Agricultural Chemists, held at Washington, D. C., on the 28th of July, 1887, with such modifications as were adopted by the Atlanta Convention of May 15, 1887, and subsequent Conventions of the same Association, will continue to be employed by the Chemists of this Department in the analysis of all commercial fertilizers.

ficed by the inactivity of the Board of Agriculture of the State of New Jersey. The manufacturers in this State should, in the first place, take this matter in hand in their own behalf, and urge an amendment of the fertilizer law which will avoid the stipulation of any chemical method, but leave this part to the regulation of the State Board of Agriculture, which, it is to be taken for granted, will not be found in opposition to the progress of chemical research, and the adoption of rules made by the Convention of Official Agricultural Chemists.

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