
Facts About Fertilizers

Licensed for Sale in Wisconsin
Reports of Analyses for 1914

W. H. STROWD



PACKING PLANTS PRODUCE MUCH COMMERCIAL FERTILIZER

Nearly all of the mixed fertilizers sold in Wisconsin contain some by-product of the packing industry.

AGRICULTURAL EXPERIMENT STATION
OF THE UNIVERSITY OF WISCONSIN

MADISON, WISCONSIN

DIGEST

The need and demand for commercial fertilizers in Wisconsin is increasing. This makes the necessity for close state supervision apparent. Page 3.

Nitrogen is the most expensive plant food usually applied in fertilizers. Since it is much more valuable in some forms than others, it is very important to know the character of the nitrogen in a commercial fertilizer. Page 4.

The available instead of the total phosphoric acid is usually considered in the valuation of a commercial fertilizer. Page 5.

Potash is much higher in price now than formerly on account of the European war. Farmers should conserve home supplies of potash. Page 5.

Knowledge of the trade value of the plant foods will help the farmer to decide whether he is being charged a fair price for the fertilizer which he buys. Page 6.

Forty brands of commercial fertilizers have been licensed for the current year. Page 8.

The analysis of samples forwarded by manufacturers and collected by the station show that in general the fertilizers sold in this state are as represented. Page 10.

Limestone and most of the phosphate rock are not included under the terms of the fertilizer law. Nevertheless, they too should be bought on the basis of their chemical analyses. Page 11.

Consumers, dealers, and manufacturers should become thoroughly acquainted with the essential features of the fertilizer law. Page 12.

FACTS ABOUT FERTILIZERS

Licensed for Sale in Wisconsin Reports of Analyses for 1914

W. H. STROWD

More and more the farmers of Wisconsin are appreciating the value of commercial fertilizers in the raising of special crops, or under certain conditions, in supplementing fertilizers produced upon the farm.¹

"The agricultural value of a fertilizer depends upon its crop-producing power. A commercial valuation does not necessarily have any relation to crop-producing value on a given farm. For a particular soil and crop a fertilizer of comparatively low commercial valuation may have a higher agricultural value; while, for another crop on the same soil, or the same crop on another soil, the reverse might be true."

Naturally as the demand for commercial fertilizers increases the necessity for close inspection and careful analysis steadily grows. The results of the chemical analyses of licensed commercial fertilizers, collected by an inspector

¹Following is a list of Wisconsin bulletins and circulars which, among other things, contain information upon the use of fertilizers in the improvement of Wisconsin soils: Wisconsin Bulletin 202, How to Improve our Heavy Clay Soils, by A. R. Whitson, E. J. Delwiche, and F. L. Muabach, May, 1914. Wisconsin Bulletin 204, Ways of Improving our Sandy Soils, by A. R. Whitson, F. J. Sievers, and H. W. Ullsperger, May, 1914. Wisconsin Bulletin 205, The Development of Marsh Soils, by A. R. Whitson and F. J. Sievers, February, 1911. Wisconsin Bulletin 230, Soil Acidity and Liming, by A. R. Whitson and W. W. Weir, May, 1913. As long as they last, copies of these publications will be sent free to residents of the state who apply for them.

and forwarded by private parties are given in this bulletin which is published in accordance with the provisions of the Wisconsin fertilizer law. By consulting the reports of these analyses the prospective purchaser may see how the actual chemical content of the fertilizers compare with the manufacturer's guarantees.

COST OF COMMERCIAL FERTILIZERS DEPENDS UPON:

1. *Retail cost of unmixed trade materials*
2. *Cost of mixing*
3. *Cost of transportation*
4. *Cost of storage and charges for commissions, bad debts, and long time credit*

An Inexpensive Fertilizer may be Best for YOUR Soil

WHAT OUR SOILS NEED

Nitrogen, phosphoric acid, potash, and lime are the plant foods most often needed to revive and enrich Wisconsin lands. These may be applied singly, or mixed in the form of a commercial fertilizer. The state fertilizer law provides that in commercial fertilizers sold in this state the per cent of the first three ingredients must be plainly marked on the sack, or other package, containing them.

THE PLANT FOODS

Nitrogen may be present in fertilizers in three forms. Two of these are soluble in water and are readily taken up by plants. In some fertilizers of vegetable and animal origin the nitrogen appears in such a form as to make it less available for plant growth. In some materials, such as leather scraps, wool waste, and hoof meal the nitrogen is very insoluble and decomposes slowly in the soil and, therefore, is of little value as plant food. Such products as tankage, blood meal, and cottonseed meal, on the other hand, are easily decomposed and in many respects are more desirable as sources of nitrogen than are some of those which are more soluble. In order to distinguish the nearly worthless from the valuable fertilizers the samples have been analyzed to determine the amount of "available" nitrogen which they contain. The results of these analyses are given in Table II.

While no laboratory method will tell exactly how much of the nitrogen in an organic fertilizer is readily available to plants the method used [the neutral permanganate (Street)] does serve to distinguish between high and low grade materials. The results of the tests, made during the past year, would indicate that only nitrogenous materials of high grade were used in the fertilizers examined in this laboratory.

Fertilizer analyses are sometimes stated in percentage of ammonia instead of percentage of nitrogen. The percentage of ammonia may be determined by multiplying the per-

On account of the European war, the shipment of potash into this country from Germany, which practically supplies the world with this product, has greatly decreased. A somewhat limited supply of potash salts is still available, but naturally at a much higher price. It will also be noticed by comparing Table I in this and previous bulletins that mixed fertilizers contain much less potash this year than in former years. Farmers whose soils and crops require potash should, therefore, at this time especially, utilize, to the fullest extent, the home supplies. The most important sources of potash on the farm are unleached wood ashes, straw, the potash in which has been made available by using it for bedding for farm animals, and the manure from farm animals whose rations were compounded from feeding stuffs rich in potash. The important concentrates containing most potash are the brans, oil meal, and cottonseed meal.

centage of nitrogen by 1.2 and the ammonia figures may be converted to nitrogen equivalents by multiplying by 0.824.

Phosphoric acid.—Phosphate rock, which is obtained principally from the mines of Tennessee, South Carolina, and Florida is the chief commercial source of phosphoric acid. In its raw state phosphate rock is extremely insoluble, and consequently the phosphoric acid in it is taken up very slowly by plants. In order to make it more quickly available, phosphate rock is treated with sulphuric acid and *acid phosphate* or *superphosphate* is produced. This is sold either alone or after being mixed with other plant food. Com-

mercial acid phosphate contains three forms of phosphoric acid:—that which is immediately available for plant use, that soluble in the soil acids and salts, and that which is insoluble. The sum of the first two forms is known as the *available*, and of course, the sum of the three forms as the *total* phosphoric acid. Phosphoric acid in such compounds as cottonseed meal and finely ground bone is usually given the same value as reverted phosphoric acid (that soluble in soil acids and salts.)

Potash.—The potash in the fertilizers sold in this state is soluble in water and, therefore, immediately available to plants.

Lime.—Lime has a definite market value as a fertilizer only when purchased in the form of compounds like carbonates (limestone and marl), sulphate (land plaster), or as quick lime or slaked lime. It should not be considered as a fertilizer but rather as a soil corrective, having as it does a very important and beneficial action on acid soil and the living processes going on therein. It may also improve the mechanical properties of such soil.

Applications of lime in the form of carbonates, quick lime, or slaked lime are necessary to correct soil acidity and will prove especially beneficial in growing legumes such as alfalfa or clover, or in the raising of sugar beets. No consideration is given, in these analyses, to the content and valuation of lime in commercial fertilizers. These valuations are made solely on the basis of the percentages of nitrogen, phosphoric acid and potash they contain.

VALUATION OF FERTILIZERS

In comparing the value of different brands of commercial fertilizers it is helpful to know the cost of the different ingredients that go into them. Table I gives the trade values of fertilizer ingredients as adopted for 1915. It is based on data gathered by certain eastern experiment stations which keep records of the retail market prices of the unmixed raw materials which are used in the manufacture of these fertilizers. This information is collected each year for the six months' period beginning September 1, and the average of these prices is used to establish an average cost of fertilizer materials.

TABLE I.—VALUE OF PLANT FOODS PER POUND

	Cents per lb.
NITROGEN	
In nitrates.....	15
In ammonia salts.....	15.5
In fine dried fish, blood, and meat.....	22
In cottonseed meal and castor pomace.....	20
In fine bone and tankage.....	21
In mixed fertilizers.....	19
In coarse bone and tankage.....	17
PHOSPHORIC ACID	
Water soluble.....	4
Citrate soluble.....	3.5
In fine bone and tankage.....	4
In coarse bone, tankage, and ashes.....	3.5
In cottonseed meal and castor pomace.....	3.5
Insoluble in water or citrate solution.....	2
Insoluble contained in mixed fertilizers.....	2
POTASH	
In high grade sulphates and mixtures free from muriates.....	9.5
In cottonseed meal and castor pomace.....	9.5
In muriate.....	8.5

To determine the commercial value of 100 pounds of fertilizer, the percentages of valuable fertilizing ingredients are multiplied in each case, by the price given in Table I. To this actual cash value of the fertilizer ingredients contained in the fertilizer should be added the cost of manufacturing and placing it on the market. This cost will vary considerably depending upon local and other conditions, but the following estimates may be taken as fairly standard:

For mixing, \$1 per ton.

For bagging, \$1 per ton.

For agents' commissions, 20 per cent of the retail cash value of ingredients.

For freight, \$2 per ton.

The valuation thus placed on the various fertilizers is, of course, commercial and not agricultural. It shows the average retail cash price of the different ingredients and the cost of placing the fertilizer on the market. The agricultural value of a fertilizer, on the other hand, depends upon a number of conditions which are beyond the control of the seller. A knowledge of the commercial value of fertilizers will assist farmers in deciding which are the most economical for their special purposes.

COMMERCIAL FERTILIZERS LICENSED FOR 1915

The manufacturers whose names are given in Table II have in accordance with Section 1494c of the Wisconsin Statutes of 1898, taken out licenses for the sale in this state during the current year of the brands of fertilizers listed.

TABLE II.—LICENSED COMMERCIAL FERTILIZERS, 1915

No.	Name of Fertilizer	GUARANTEES				Manufacturer
		Nitro- gen	Phosphoric Acid		Potash	
			Total	Avail- able		
		Per ct.	Per ct.	Per ct.	Per ct.	
1	Homestead Bone Black Fertilizer.....	2.05	10.00	8.00	1.50	The American Agricul- tural Chemical Co., Detroit, Mich.
2	Homestead General Fertilizer.....	1.65	10.00	8.00	3.00	
3	A-1 Potash Fertilizer.....	.82	10.00	8.00	3.00	
4	Red Line Phosphate with Potash.....		12.00	10.00	2.00	
5	Armour's 1-8-2 Fertilizer.....	.82	8.50	8.00	2.00	Armour Fertilizer Works, Chicago
6	Armour's 1-12-1 Fertilizer.....	.82	12.50	12.00	1.00	
7	Armour's 2-10-2 Fertilizer.....	1.65	10.50	10.00	2.00	
8	Armour's 2-8-3 Fertilizer.....	1.65	8.50	8.00	3.00	
9	Armour's 3-8-3 Fertilizer.....	2.47	8.50	8.00	3.00	
10	Armour's Grain Grower.....	1.65	8.50	8.00	2.00	
11	Armour's 12-2 Fertilizer.....		12.50	12.00	2.00	
12	Armour's Star Phosphate.....		14.50	14.00		
13	Armour's Bone Meal.....	1.65	27.00			
14	Armour's Standard.....	.82	8.50	8.00	3.00	
15	Nitrate of Soda.....	14.70				
16	Barwell's Complete Lawn and Garden Fertilizer (Plant Grower and Land Ren- ovator).....	5.00	10.50	5.25	6.00	Blatchford's Calf Meal Factory, Waukegan, Ill.
17	Currie's Garden and Lawn Fertilizer.....	4.10	9.00	8.00	7.00	Currie Brothers Co., Mil- waukee
18	Darling's Big Harvest Special.....	1.60	14.00	12.00	3.00	Darling & Co., Chicago
19	Darling's Sure Winner Brand.....	.80	10.00	8.00	3.00	
20	Darling's Chicago Brand.....	1.60	10.00	8.00	2.00	
21	Darling's 12-2 Brand.....			12.00	2.00	
22	Muriate of Potash.....				48.00	German Kali Works, Inc., New York
23	Sulphate of Potash.....				47.00	
24	Kainit.....				12.00	
25	Calumet Brand Potato, Tobacco and Beet Grower.....	1.64	9.00	8.00	5.00	
26	Calumet Brand Wheat, Corn and Oat Special.....	.82	9.00	8.00	4.00	Hish, Stein & Co., Chi- cago
27	C. F. & C. W. Lion Brand.....			10.00	2.00	Internat. Agricul. Corp., Lockland, Ohio
28	C. F. & C. W. Crescent Brand.....	.82		8.00	3.00	
29	Special Brand.....	3.00	10.00	8.00	3.00	
30	Badger State Brand.....	2.00	11.00	9.00	2.00	
31	Wizard Brand Manure.....	1.80	1.00	1.00	1.00	Kamsha Pulverized Manure Co., Chicago
32	Swift's Diamond "N" Grain Grower.....	1.65	10.00	9.00	1.00	Swift & Co., Chicago
33	Swift's Diamond "K" Grain Grower.....	.82	12.50	12.00	1.00	
34	Swift's Superphosphate.....	1.65	9.00	8.00	2.00	
35	Swift's Diamond "W" Vegetable Grower.....	1.65	9.00	8.00	3.00	
36	Swift's Diamond "A" Vegetable and Beet Grower.....	2.47	9.00	8.00	3.00	
37	Swift's Garden City Phosphate.....			14.00		
38	Swift's High Grade Acid Phosphate.....			16.00		
39	Swift's 12-1 Brand.....			12.00		
40	No. 1569 Steam Bone.....	1.234	27.46			U.S. Glue Co., Milwaukee

ANALYSES OF LICENSED COMMERCIAL FERTILIZERS, 1914

The Station analyses of samples of licensed commercial fertilizers collected at retail stores in this state and those forwarded by manufacturers are given in Table III. The guarantees for the different ingredients are given in *italics*. Where deficiencies of a quarter of one per cent or more were found the results of the test are given in **heavy type**.

WHEN CHOOSING COMMERCIAL FERTILIZERS
CONSIDER

1. *The needs of the crops to be raised*
2. *The character of the soil*
3. *The condition of the soil*
4. *The character of the various fertilizing materials to be used*
5. *The cost of the plant food materials*

Origin of samples.—The samples for analyses were collected from the following stores:

- 34, 35, 36, 37—Patrons Mercantile Co., Black Earth
20, 23, 25—H. Tischendorf, Franksville
47—Wilbur Lumber Co., Lake Geneva
19—James Callen, Caledonia
21, 22, 30, 41—L. L. Olds Seed Co., Madison
38, 44—D. H. Utter, Lake Beulah
24, 26, 27—Baumann & Murphy, Corliss
29—Asdahl & Nielson, Racine
45—H. T. Rozell, Bancroft, (Forwarded)
28—Jensen & Olsen, Kenosha
40—The Dunnebacke Co., Kenosha
39—J. F. Beardsley, Lone Rock
42, 43, 48, 49—F. M. Roberts, Woodworth

The sampling of the different brands of fertilizers was done by C. L. Adams, assistant in feed and fertilizer inspection, and the chemical analyses were made, very largely, by J. C. Jurrjens, assistant chemist.

TABLE III.—ANALYSES OF COMMERCIAL FERTILIZERS LICENSED FOR SALE

A. Samples Collected by the Station; 1914

No.	Name of Fertilizer	Nitrogen				Phosphoric Acid				Potash		Price per ton or 100 lbs.
		Total		Avail-able	Water soluble	Total		Available		Guar.	Found	
		Guar.	Found	Found	Found	Guar.	Found	Guar.	Found			
		Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	
35	All Potash Fertilizer ¹	0.65	1.08	0.99	0.80	10.0	10.05	8.0	9.13	5.0	2.95	1.60
34	Homestead Bone Black Fertilizer ¹	2.06	2.26	2.11	1.30	10.0	10.0	8.0	8.70	1.5	1.50	1.80
36	Homestead High Grade Garden & Vegetable Fertilizer ¹	1.65	1.83	1.66	1.06	10.0	9.85	8.0	8.63	5.0	5.00	1.80
37	Red Line Phosphate with Potash ¹					12.0	10.26	10.0	9.80	2.0	2.10	
23	All Soluble ²	2.88	3.04			8.5	10.15	8.0	8.70	4.0	4.12	32.00
47	Bone Meal ³	2.47	2.25	2.14	.73	27.0	27.24				2.23	40.00
10	Grain Grower ⁴	1.65	1.80	1.70	1.07		11.0	8.0	8.50	2.0		24.00
30	Fruit and Root Crop Special ⁵	1.65	1.35	1.29	1.11		10.10	8.0	8.15	3.0	5.34	30.00
21	High Grade Potato Fertilizer ⁶	1.65	2.05	1.91	1.37		11.25	8.0	8.95	10.0	10.34	35.00
44	Kainit ⁷										12.14	18.00
24	Phosphate and Potash ⁸						11.3	10.0	10.23	2.0	2.08	17.50
24a	Star Phosphate ⁹						14.85	14.0	14.15			18.00
20	Sugar Beet Special ¹⁰.....	.82	.84	.83	.44		11.45	8.0	9.8	4.0	4.08	24.00
22	Tobacco Grower ¹¹	1.65	1.62	1.44	1.05		10.6	8.0	8.65	5.0	5.08	30.00
29	Plant Grower and Land Renovator ¹²	5.0	5.41	5.24	4.79	10.50	9.25	5.35	4.38	6.0	6.00	3.00
45	Muriate of Potash ¹³									50.0	52.54	
28	Badger State Brand ¹⁴	2.6	2.59	2.20	1.57	11.0	11.45	9.0	10.18	2.0	2.36	1.50
41	Sheep Manure ¹⁵	2.25	2.35	1.45	0.83	1.25	1.52	1.0	1.02	1.50	1.51	25.00
40	Wizard Brand Manure ¹⁶	1.8	2.05	1.43	0.31		1.54	1.0	1.32	1.0	3.13	1.75
39	Corn, Wheat and Oats Fertilizer ¹⁷	1.65	.97	.94	.54	9.0	11.65	8.0	8.15	2.0	2.23	28.00
49	Diamond G Fertilizer ¹⁸						11.15	10.0	9.8			48.00
42	Muriate of Potash ¹⁹									50.0	53.62	48.00
20	Onion, Potato and Tobacco Fertilizer ²⁰	1.65	1.58	1.31	.65	9.0	9.59	8.0	8.15	7.0	7.91	28.00
48	Special Phosphate and Potash ²¹						12.3	10.0	11.23	2.0	2.36	10.00
43	Sulphate of Potash ²²									48.0	48.42	50.00
25	Superphosphate ²³	1.65	1.69	1.49	.93	9.0	10.40	8.0	8.3	2.0	2.28	25.00
27	Truck Grower ²⁴.....	.82	.84	.81	.44	8.5	9.70	8.0	8.45	4.0	4.27	23.50

¹ Manufactured by the American Agriculture Chemical Co., Detroit; ² The Armour Fertilizer Works, Chicago; ³ Darling and Co., Chicago; ⁴ International Agricultural Corporation, Cincinnati; ⁵ N. S. Koss and Sons Co., Kenosha, Wis.; ⁶ Swift and Co., Chicago; ⁷ J. W. Barwell, Waukegan, Ill.; ⁸ German Kall Works, Chicago; ⁹ National Guano Co., Aurora, Ill.; ¹⁰ Pulverized Manure Co., Chicago.

B. Manufacturer's Samples: 1915

No.	Name of Fertilizer	Nitrogen		Phosphoric Acid				Potash	
				Total		Available			
		Guar. Per ct.	Found Per ct.	Guar. Per ct.	Found Per ct.	Guar. Per ct.	Found Per ct.	Guar. Per ct.	Found Per ct.
3	Homestead General Fertilizer ¹	1.65	1.93	10.0	10.50	8.0	10.27	3.0	3.32
4	Nitrate of Soda ²	14.76	15.13						
5	1-8-2 Fertilizer ³	0.82	0.92	8.5	9.00	8.0	7.85	2.0	2.12
6	1-12-1 Fertilizer ³	0.82	1.08	12.5	13.62	12.0	12.21	1.0	0.82
7	2-10-2 Fertilizer ³	1.65	1.70	10.5	13.22	10.0	9.82	2.0	2.45
8	2-8-3 Fertilizer ³	1.65	2.03	8.5	10.70	8.0	7.80	3.0	4.31
9	3-8-3 Fertilizer ³	2.47	2.86	8.5	11.20	8.0	7.96	3.0	3.85
10	12-2 Fertilizer ³			12.5	12.38	12.0	12.20	2.0	4.04
10	Big Harvester Special ⁴	1.60	1.76	14.0	14.62	12.0	14.15	3.0	2.81
11	12-2 Fertilizer ³				13.75	12.0	13.13	2.0	1.91
12	Chicago Brand ⁵	1.60	1.54	10.0	11.75	8.0	9.75	2.0	2.41
13	Crescent Brand ⁶	0.82	1.09		11.07	8.0	9.77	3.0	3.34
14	Lion Brand ⁶				11.40	10.0	10.25	2.0	2.61
2	Special Brand ⁶	3.0	3.46	10.0	10.80	8.0	7.85	3.0	3.69
1	Badger State Brand ⁶	2.0	2.14	11.0	12.15	9.0	9.43	2.0	2.11

Limestone and miscellaneous unlicensed fertilizers.—As the state fertilizer law applies only to commercial fertilizers or fertilizing materials, the price of which exceeds \$10 per ton, but little ground rock phosphate or ground limestone comes under its provisions. Both rock phosphate and limestone, however, are important materials in the maintenance of soil fertility and these, like other fertilizers, should be bought on the bases of their chemical analyses. The analyses of ground limestone and miscellaneous unlicensed fertilizers made in this laboratory during the past year are given in Table IV.

TABLE IV.—ANALYSES OF GROUND LIMESTONE AND MISCELLANEOUS UNLICENSED FERTILIZERS, 1914

No.	Name of Material	Sender	Water	Nitrogen	Phosphoric acid	Potash	Calcium carbonate	Magnesium carbonate
							Per ct.	Per ct.
52	Limestone.....	Frank Bruemmer, Hudson.....					50.93	23.54
53	".....	F. L. Fargo, Lake Mills.....					61.64	23.09
54	".....	F. L. Fargo, Lake Mills.....					60.19	24.09
2	".....	C. D. Gordon, Mineral Point.....					51.52	32.04
3	".....	C. D. Gordon, Mineral Point.....					50.17	35.94
55	".....	D. Lee, Edmonds.....					51.26	21.38
18	".....	Racine Nursery Co., Racine.....					90.16	2.95
59	Garbage ashes.....	City Incinerator, Racine.....		.23	4.75	.86		
51	Hops residue.....	T. J. Ferguson, Wauwatosa.....	71.0	1.15	0.68			
16	Leather scraps.....	C. S. Schulpfus Sons, Milwaukee.....		3.98				
46	Phosphate rock.....	B. D. Clark, Racine.....			16.51			

The analyses show that the samples of limestone analyzed were of two kinds—fairly pure limestone containing over 92 per cent calcium carbonate and dolomitic limestone composed of about 50 per cent calcium carbonate and from 20 to 40 per cent magnesium carbonate. The latter is the kind commonly found in this state. For correcting acidity of soils there would not be, at the same price, much choice between these materials. Pure dolomitic limestone would go a little further for this purpose than pure calcium carbonate.

NOTES ON FERTILIZER INSPECTION

It is impossible, as a rule, to tell, from the appearance or odor of a fertilizer, whether or not it contains a large amount of valuable fertilizing ingredients. There is, therefore, a strong temptation for irresponsible parties to make and sell, as standard fertilizing articles, inferior or even worthless goods. This has made state supervision of sales necessary in all states where a considerable amount of fertilizer is used. Laws regulating the sale of commercial fertilizers are now in force in nearly every state in the Union.

During the years that have passed since the Wisconsin fertilizer law went into effect there have been but few violations of its provisions. As a rule manufacturers comply with the provisions of the law both as a business policy and because they appreciate that state supervision of fertilizers is necessary for their own protection as well as for the protection of consumers against unscrupulous manufacturers or dealers.

ESSENTIAL FEATURES OF THE FERTILIZER LAW

The state fertilizer law which was passed by the Legislature of 1895 is found as later amended in Sections 1494c-1494e of the Wisconsin Statutes of 1898. All commercial fertilizers selling for more than \$10 per ton are subject to its provisions. In order to comply with the law the manufacturers of such fertilizers should proceed as follows:

Write to Director of the Agricultural Experiment Station, Fertilizer Inspection Service, Madison, Wisconsin, for a license application blank. Fill out the blank, giving the

names of the different brands, and reporting the minimum percentages of the following constituents contained in each: nitrogen in an available form, potash soluble in water, available phosphoric acid, and total phosphoric acid. This information, together with the net weight and manufacturer's name should also appear on the package in which the fertilizer is sold. The license application blank when properly filled out, should be forwarded to the Director, together with \$25 for each brand of fertilizer to be analyzed. All license fees are paid into the treasury of the Experiment Station. Licenses should be obtained during December prior to the year in which they are to be sold. At the request of the Director, who is charged with the enforcement of the law, samples of each brand must accompany the application.

The Director is authorized to collect, in person or by deputy, samples of fertilizers sold in this state and is required to analyze them and publish the results before the next succeeding April.

Any person who sells a fertilizer, which is under the jurisdiction of this law, without complying with its provisions or who sells such fertilizer which does not meet its claims as regards its guaranteed composition may, upon conviction, be fined \$100 for the first offense and \$200 for each subsequent offense.

WHY COMMERCIAL FERTILIZERS ARE USED

To maintain the fertility of farms upon which little or no live stock is kept it is necessary to buy and apply commercial fertilizers.

Experience is teaching us that commercial fertilizers may be used to good advantage in the raising of special crops, are easily handled, and as a rule, contain fertilizing elements in such a form as to be readily available for plant use.

The increasing use of such fertilizers makes close inspection of their sale more important and necessary. We need to know not only what are the best fertilizers for the different special crops and different types of soil, but also that the stock offered for sale be as guaranteed.

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