

Commercial Fertilizers

JULY, 1934

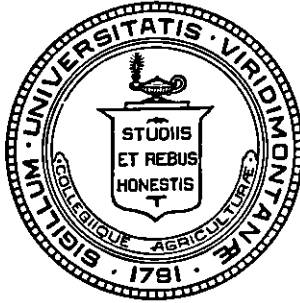
University of Vermont and State Agricultural Experiment Station

Vermont Agricultural Experiment Station

BURLINGTON, VERMONT

COMMERCIAL FERTILIZERS

By L. S. WALKER *and* E. F. BOYCE



Manufacturers have met the requirements of the Vermont law well during 1934. Only nine brands of mixed goods and five of crude stock failed to furnish all the plant food that was promised, in only six instances did a shortage occur in the total amount of plant food guaranteed, and in but two cases did this shortage exceed three percent. One brand, 8-16-14, manufactured by Standard Wholesale Phosphate & Acid Works, was deficient to the extent of 11 percent.

Two brands of sheep manure contained more sand than they did last season and one brand was low in phosphoric acid. The lime products were well above guaranty, save one brand which was low in calcium oxide.

Two brands of mixed goods contained organic nitrogen of inferior activity, but the overrun in total nitrogen more than offset the percentage of inactive organic nitrogen. A trifle less organic nitrogen was used in this year's goods than in last year's brands.

Every brand (with one exception) licensed was in the so-called "high analysis" class, carrying 14 percent or more of plant food.

Fertilizer usage for 1933 is reported together with a grouping of tonnage by grades which shows some of the more popular mixtures. The tonnage sold in Vermont in 1933 was 20 percent less than that sold in 1932. The returns for 1934 are not all in at the time of the issuance of this bulletin, but there seems reason to believe that a few thousands of tons more were sold in 1934 than in 1933.

Mixed fertilizers cost on the average \$39 per ton, which is five dollars more than last year.

BULLETIN 381: COMMERCIAL FERTILIZERS

By L. S. WALKER AND E. F. BOYCE

The results of the 1934 inspection are set forth herewith in condensed form. The licenses cover: Complete mixed fertilizers 112; crude stocks 46; sheep, goat and poultry manures 7; limes 19; total 184.

The station sampling agents visited many Vermont cities, towns and villages in the spring of 1934 and drew 355 samples from dealers' stocks representing 144 of the 184 brands licensed for sale. No samples of the 40 brands named below were secured.

ACME GUANO, Co., Baltimore, Md.

Acme 4-8-4; Acme 7-12-10; Muriate of Potash; 6% Tankage; Raw Bone.

ARMOUR FERTILIZER WORKS, New York, N. Y.

Armours Big Crop Fertilizers 8-16-20; Armours Big Crop Fertilizers 8-16-14; Armours Big Crop Fertilizers 6-11-10; Armours Big Crop Fertilizers 3-10-4; Armours Big Crop Fertilizers 4-8-4; Armours Big Crop Fertilizers 4-16-4; Armours Big Crop Fertilizers 2-12-4; Sulphate of Ammonia.

BARRETT Co., New York, N. Y.

Arcadian Sulphate of Ammonia; Sulphate of Ammonia.

CHILEAN NITRATE SALES CORP., New York, N. Y.

Standard Chilean Nitrate of Soda.

CONSOLIDATED RENDERING Co., Boston, Mass.

Superphosphate 20%.

EASTERN STATES FARMERS' EXCHANGE, Springfield, Mass.

Nitrophoska 15-30-15; Eastern States 4-16-20; Muriate of Potash; Sulphate of Ammonia.

LOWELL FERTILIZER Co., Boston, Mass.

Lowell 2-8-10 Vegetable & Grain; Lowell 4-8-7 Old General Crop Manure for Potatoes & Market Garden Crops; Lowell 5-8-10 Aroostook Special for Potatoes.

OLDS & WHIPPLE, INC., Hartford, Conn.

O&W 8-16-14 Double Strength Potato Fertilizer; Luxura 5-8-6.

ROGERS & HUBBARD Co., Portland, Conn.

Hubbard's "Bone Base" Oats & Top Dressing; Red H Brand 8-16-14.

STANDARD WHOLESALE PHOSPHATE & ACID WORKS, INC., Baltimore, Md.

20% Superphosphate; Standard United States 2-8-10; Standard United States 3-12-6; Standard United States 4-16-10.

L. B. ANDREWS & SON, Wilmington, Vt.

Agricultural Limestone.

DOMINION LIME Co., Lime Ridge, P. Q.

Dudswell Brand Ground Limestone.

HOOSAC VALLEY LIME Co., INC., Adams, Mass.

Adams Land Lime.

LAWRENCE PORTLAND CEMENT Co., Thomaston, Me.

Dragon Mainrok Agricultural Hydrated Lime; Dragon Mainrok Magnesian Agricultural Hydrated Lime; Dragon Mainrok Land Lime.

SOLVAY PROCESS Co., Syracuse, N. Y.

Solvay Pulverized Limestone.

EDWARD VIVIE, Perkinsville, Vt.

Agricultural Lime.

Several of the brands which were not sampled as a matter of fact were not sold in Vermont this year. There appears to have been no demand for them. This situation has prevailed more or less every year. Then, again, some brands were shipped in very small quantities. Furthermore it often happens, under the modern conditions of the fertilizer trade, that a car is received at a railroad station and its contents are drawn away within 24 hours and, not infrequently, sown upon the land within a day or two. Moreover fertilizers are often delivered by truck direct from the factory or the jobber's warehouse to the very farms and onto the very fields on which they are to be used and are sown immediately. Under such circumstances the station's sampling agents can not obtain samples. During recent years this group has represented about four percent of the entire tonnage.

BRANDS SAMPLED AND ANALYZED

The condensed statements on the following pages indicate:

- (1) Those brands of mixed goods which have fulfilled their guaranties (table I, pages 5 to 7).
- (2) Those brands of crude stock which conform to promise (table II, page 8).
- (3) The 14 brands which contained less plant food than guaranteed (table III, page 9).
- (4) Sheep, etc., manures and limes (tables IV and V, pages 10, 11).

Table I (pages 5 to 7), shows:

1. The names and addresses of licensees.
2. The brand names.
3. The "grades"—nitrogen, available phosphoric acid¹ and water-soluble potash.
4. The percentage of the total nitrogen in each brand present in water-soluble form.
5. The percentage of total phosphoric acid in each brand present in so-called available form.
6. The facts as to the quality of the organic nitrogen contents.
7. The source of potash, whether muriate, sulphate or nitrate.

Table II (page 8) shows the analyses of the sundry crude stocks which were found to be equivalent to their guaranties.

Table III (page 9) sets forth the facts as to 14 brands which failed to meet their guaranties. In 8 cases no actual shortage occurred, due to the fact that the overruns more than offset the underruns. The shortages occurring in six brands are recorded in the last column. They range from 1.5 to 11 percent.

¹ Total phosphoric acid guaranty is usually 0.5 percent or 1.0 percent greater than is that of the available phosphoric acid and sometimes is identical with it.

I. MIXED FERTILIZERS SUBSTANTIALLY COMPLYING WITH GUARANTIES

Brand name	Grade	Percentage of nitrogen which is water-soluble	*(See title-in footnote)
Acme Guano Co., 311 Marine Bank Bldg., Baltimore, Md.			
Acme 4/8/10	4- 8-10	96	100
Acme 2/8/10	2- 8-10	96	100
Acme 2/8/5	2- 8- 5	95	98
American Agricultural Chemical Co., 285 River St., North Weymouth, Mass.			
AA Double Strength Fertilizer 8/16/14...	8-16-14	98	98
AA Top Dresser 7/6/6.....	7- 6- 6	96	100
AA Aroostook Potato Manure 5/8/7.....	5- 8- 7	96	94
AA Complete Manure with 10% Potash 4/8/10	4- 8-10	96	94
AA Peerless Fertilizer 4/8/7.....	4- 8- 7	92	95
AA Monarch Fertilizer 4/8/4.....	4- 8- 4	95	95
AA Corn Favorite 3/10/4.....	3-10- 4	95	96
AA Prolific 10% Potash Fertilizer 2/8/10	2- 8-10	97	93
AA General Crop Fertilizer 2/10/2.....	2-10- 2	88	91
Agrico for Lawns, Trees & Shrubs 7/6/6	7- 6- 6	94	95
Agrico for Aroostook with 10% Potash 5/8/10	5- 8-10	97	91
Agrico for Potatoes & Vegetables 5/8/7..	5- 8- 7	92	100
Agrico for New England 4/8/10.....	4- 8-10	95	89
Agrico for Corn 3/10/6.....	3-10- 6	94	95
Bowkers Market Garden Fertilizer 4/8/4	4- 8- 4	89	95
Bradley's Complete Manure with 10% Potash 4/8/10.....	4- 8-10	92	100
Bradley's XL Fertilizer 3/10/4.....	3-10- 4	89	94
Apothecaries Hall Co., Box 1009, Waterbury, Conn.			
Liberty Market Gardeners Special 4/8/4..	4- 8- 4	97	96
Armour Fertilizer Works, 10 East 40th St., New York, N. Y.			
Armours Big Crop Fertilizers 8/16/16....	8-16-16 ²	99	97
Armours Big Crop Fertilizers 7/6/6.....	7- 6- 6	98	99
Armours Big Crop Fertilizers 5/8/7.....	5- 8- 7	80	94
Armours Big Crop Fertilizers 4/8/10.....	4- 8-10	82	91
Armours Big Crop Fertilizers 4/8/4.....	4- 8- 4	82	90
Consolidated Rendering Co., 178 Atlantic Ave., Boston, Mass.			
Corenco 8/16/14 Two-In-One	8-16-14	92	100
Corenco 7/13/11 "It Cuts the Cost".....	7-13-11	93	100
Corenco 7/6/6 Top Dresser.....	7- 6- 6	100	100
Corenco 5/8/10 Peerless Potato.....	5- 8-10	93	100
Corenco 5/8/7 General Crop Manure.....	5- 8- 7	100	100
Corenco 4/8/10 Potato Grower.....	4- 8-10	100	100
Corenco 4/12/4 Complete Manure.....	4-12- 4	99	99
Corenco 4/8/7 Market Garden.....	4- 8- 7	100	98
Corenco 4/8/4 Corn & Vegetable.....	4- 8- 4	100	99
Corenco 3/10/4 Animal Brand.....	3-10- 4	98	100
Corenco 2/8/10 Potato & Oat Special....	2- 8-10	100	100
Corenco 2/10/2 Bone Brand.....	2-10- 2	70	100

* Percentage of total phosphoric acid present in so-called available form.

¹ One-eighth of potash as sulphate; remainder as muriate.

All brands listed "passed" in respect to the quality of their organic nitrogen contents and, save in one case, carried potash as muriate.

I. . MIXED FERTILIZERS SUBSTANTIALLY COMPLYING WITH GUARANTIES

—continued

Brand name	Grade	Percentage of nitrogen which is water-soluble	*(See title-in footnote)
Eastern States Farmers' Exchange, Box 1482, Springfield, Mass.			
Eastern States 12/16/12 Open Formula...	12-16-12 ¹	97	100
Eastern States 12/4/4 Open Formula.....	12- 4- 4	97	96
Eastern States 8/24/8 Open Formula.....	8-24- 8 ²	96	98
Eastern States 8/16/16 Open Formula.....	8-16-16 ³	97	99
Eastern States 6/15/9 Open Formula.....	6-15- 9	95	96
Eastern States 4/12/4 Open Formula.....	4-12- 4 ⁴	94	96
Eastern States 4/10/6 Open Formula.....	4-10- 6	94	93
Eastern States 4/8/8 Open Formula.....	4- 8- 8	92	93
Eastern States 0/14/6 Open Formula.....	0-14- 6	..	96
Thomas W. Emerson Co., 213 State St., Boston, Mass.			
Emerson's English Formula Lawn & Garden Dressing	5- 7- 2	67	86
International Agricultural Corp., 39 Chauncy St., Boston, Mass.			
International 5/8/7	5- 8- 7	98	100
International 4/8/10	4- 8-10	100	97
International 4/8/4	4- 8- 4	95	96
Lowell Fertilizer Co., 178 Atlantic Ave., Boston, Mass.			
Lowell 7/6/6 Top Dressing.....	7- 6- 6	100	100
Lowell 5/8/7 Market Garden Manure....	5- 8- 7	100	100
Lowell 4/8/10 Potato Grower.....	4- 8-10	100	100
Lowell 4/8/4 Corn & Vegetable.....	4- 8- 4	100	100
Lowell 3/10/4 Animal Brand.....	3-10- 4	100	100
Lowell 2/10/2 Bone Brand.....	2-10- 2	77	100
J. O. Middlebrook & Sons, 190 College St., Burlington, Vt.			
Midco Special Lawn & Garden Fertilizer 7/6/6	7- 6- 6	93	97
Miller Fertilizer Co., Baltimore Trust Co. Bldg., Baltimore, Md.			
Miller Harvest Brand 4/8/4.....	4- 8- 4	97	100
Old Deerfield Fertilizer Co., Inc., 28 Sugarloaf St., South Deerfield, Mass.			
Old Deerfield 7/6/6.....	7- 6- 6	99	100
Old Deerfield 5/8/7.....	5- 8- 7	90	93
Old Deerfield 3/10/6.....	3-10- 6	80	95
Valley 4/6/10	4- 6-10 ⁵	87	92
Valley 4/8/7	4- 8- 7	97	100
Valley 4/8/4	4- 8- 4	99	95

* Percentage of total phosphoric acid present in so-called available form.

¹ Two-thirds of potash as nitrate; remainder as muriate.

² Seven-eighths of potash as nitrate; remainder as muriate.

³ Three-sixteenths of potash as sulphate; remainder as muriate.

⁴ One-half of potash as sulphate; remainder as muriate.

⁵ Potash as sulphate.

All brands listed above "passed" in respect to the quality of their organic nitrogen contents and, save in five cases, carried potash in the form of muriate.

I. MIXED FERTILIZERS SUBSTANTIALLY COMPLYING WITH GUARANTIES
—concluded

Brand name	Grade	Percentage of nitrogen which is water-soluble	*(See title in footnote)
Olds & Whipple, Inc., 164-168 State St., Hartford, Conn.			
O&W 4/8/7 Potato and General Purpose Fertilizer	4- 8- 7	71	90
Rogers & Hubbard Co., Portland, Conn.			
Hubbard's "Bone Base" Oats & Top Dressing	8- 5- 8	93	78
Hubbard's Potato Fertilizer 5/8/7.....	5- 8- 7	84	87
Hubbard's All Soils-All Crops Fertilizer 4/8/4	4- 8- 4	84	86
Hubbard's High Potash Fertilizer 2/8/10.	2- 8-10	88	92
Hubbard's Corn & Grain Fertilizer 2/12/4	2-12- 4	89	93
Red H Brand 7/6/6.....	7- 6- 6	99	100
Red H Brand 5/8/7.....	5- 8- 7	100	100
Red H Brand 4/8/7.....	4- 8- 7	97	96
Red H Brand 4/8/4.....	4- 8- 4	95	91
Standard Wholesale Phosphate & Acid Works, Inc., 1600 Continental Bldg., Baltimore, Md.			
Standard United States 7/6/6.....	7- 6- 6	90	94
Standard United States 4/8/4.....	4- 8- 4	94	96
Standard United States 4/8/10.....	4- 8-10	91	95
Standard United States 1/9/4.....	1- 9- 4	76	95
Stimulant Laboratories, Inc., Daily Star Bldg., Long Island City, N. Y.			
Stim-U-Plant 11/12/15	11-12-15 ¹	100	100
Swift & Co., Court Square Bldg., Baltimore, Md.			
Vigoro 4/12/4	4-12- 4	93	95
Tennessee Corp., Lockland, Ohio			
Loma 5/10/4	5-10- 4	92	95

* Percentage of total phosphoric acid present in so-called available form.

¹ Potash as sulphate.

All brands listed above "passed" in respect to the quality of their organic contents and, save in one case, carried potash in the form of muriate.

II. CRUDE STOCKS SUBSTANTIALLY COMPLYING WITH GUARANTIES

Nitrogenous materials	Nitrogen			
	Found	Guaranteed		
<i>Nitrate of Soda</i>				
Barrett Co., New York, N. Y., "Arcadian".....	16.10	16		
Chilean Nitrate Sales Corp., New York, N. Y., "Champion"	16.10	16		
<i>Sulphate of Ammonia</i>				
American Agricultural Chemical Co.....	20.94	20.56		
Consolidated Rendering Co.	20.49	20.5		
Ford Motor Co., Dearborn, Mich., "Ford".....	21.22	20.8		
Old Deerfield Fertilizer Co.....	20.80	20.5		
<i>Air-nitrogen Products</i>				
American Cyanamid Co., New York, N. Y., Aero Cyanamid	22.14	22		
Eastern States Farmers' Exchange, Eastern States Cal-nitro	21.36	20.5		
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Nitrogenous and phosphatic material	Nitrogen		Total phosphoric acid	
	Found	Guar.	Found	Guar.
<i>Ground Bone</i>				
Joseph Breck & Sons Corp., Boston, Mass., "Raw"	4.16	3.7	22.90	20
Consolidated Rendering Co.....	2.20	2.05	26.10	22.9
Dr. Heinz Co., Cincinnati, Ohio, "Odorless" ..	1.01	1	31.44	29
International Agricultural Corp.	2.41	2.47	25.80	22
Old Deerfield Fertilizer Co., "Old Deerfield" ..	2.87	2.47	24.34	22
Rogers & Hubbard Co.....	3.92	3.29	23.16	20.5
F. Rynveld & Sons, New York, N. Y.....	3.11	1.85	23.50	22.88
Swift & Co.	3.08	2.47	27.20	22
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Phosphatic materials	Phosphoric Acid		Available	
	Found	Total Guar.	Found	Guar.
<i>Superphosphate (Acid Phosphate)</i>				
Acme Guano Co.....	17.86	16	16.96	16
American Agricultural Chemical Co.....	18.08	..	17.82	16
Apothecaries Hall Co.....	17.52	..	17.04	16
Armour Fertilizer Works.....	17.52	..	16.58	16
Consolidated Rendering Co.....	18.14	..	18.14	16
Eastern States Farmers' Exchange.....	17.40	16.5	16.86	16
Eastern States Farmers' Exchange.....	32.02	32.5	32.02	32
International Agricultural Corp.	18.20	..	16.88	16
Miller Fertilizer Co.	16.88	..	16.48	16
Old Deerfield Fertilizer Co.....	18.00	17	17.60	16
Rogers & Hubbard Co.....	17.92	..	17.26	16
Standard Wholesale Phosphate & Acid Works	17.24	..	16.32	16
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Potassic materials	Potash			
	Found	Guaranteed		
<i>Muriate of Potash</i>				
Eastern States Farmers' Exchange.....	61.62	60		
N. V. Potash Export My. Corp., New York, N. Y.....	51.60	48		

III. NINE BRANDS OF MIXED GOODS AND FIVE OF CRUDE STOCK FAILING TO MAKE GOOD THEIR GUARANTIES

Manufacturer and Brand	Grade	Nitrogen			Phosphoric Acid				Potash		
		Water-soluble	Found	Guaranteed	Total		Available		Found	Guaranteed	Shortage
					Found	Guaranteed	Found	Guaranteed			
Acme Guano Co., Acme 4/8/7.....	4/8/7	3.75	3.81	4	8.52	...	8.46	8	7.13	7	None
Amer. Agr. Chem. Co., Muriate of Potash†...	0/0/50	...	...	...	...	...	...	...	49.23	50	2%
Amer. Agr. Chem. Co., Fine Ground Bone†..	2.47/23/0	...	3.08	2.47	22.60	23	...	...	...	...	None
Consolidated Rendering Co., Ground Tankage†	7.41/9.15/0	...	7.07	7.41	12.57	9.15	...	...	...	...	None
Consolidated Rendering Co., Muriate of Potash	0/0/50	...	...	...	...	...	...	...	49.20	50	2%
Eastern States Farmers' Exchange, Eastern States 6/8/6	6/8/6	6.52	6.79	6	8.60	8.25	8.40	8	5.25	6	None
Howard Hardware Co., Howard's Special Flower, Lawn & Garden Fertilizer.....	4/7/8	2.46	4.48	4	9.34	9	7.92	7	7.13	8	None
Miller Fertilizer Co., Miller Harvest Brand 5/8/7	5/8/7	4.63	4.69	5	9.36	...	9.36	8	6.40	7	None
Old Deerfield Fertilizer Co., Inc., Valley 10/20/20	10/20/20	10.44	10.68	10	20.62	20	20.62	20	19.42	20	None
Old Deerfield Fertilizer Co., Inc., Valley 4/8/10 ¹	4/8/10	3.29	3.81	4	11.92	8	10.92	8	7.02	10	1%
Standard Whole. Phos. & Acid Wks., Standard United States 5/8/7.....	5/8/7	4.83	5.28	5	8.96	...	8.46	8	6.42	7	None
Standard Whole. Phos. & Acid Wks., Standard United States 8/16/14†.....	8/16/14	6.77	6.90	8	15.81	...	15.52	16	11.35	14	11%
Standard Whole. Phos. & Acid Wks., Muriate of Potash	0/0/48	...	...	...	...	...	...	...	46.30	48	4%
Tennessee Corp., Soil Prep 4/2/2.....	4/2/2	2.56	4.16	4	1.76	2	1.32	2	2.30	2	3%

† Analysis represents average of two samples.
¹ Two-fifths as sulphate; remainder as chloride.

IV. SHEEP, GOAT AND POULTRY MANURES

Manufacturer and Brand	Moisture	Organic matter	Insoluble matter (sand)	Nitrogen		Phosphoric Acid		Potash	
				Found	Guaranteed	Found	Guaranteed	Found	Guaranteed
American Agricultural Chemical Co. Pulverized Sheep & Goat Manure..	9.83	23.24	37.59	1.36	1.23	0.96	1	3.10	2
Consolidated Rendering Co. Corenco Sheep Manure.....	6.03	31.43	32.42	1.43	1.23	1.10	0.5	3.61	2
Old Deerfield Fertilizer Co., Inc. Sheep Manure	10.96	57.10	11.29	2.90	1.50	1.90	1	5.90	2
Premier Poultry Manure Co., Chicago, Ill. Premier Brand Pulverized Poultry Manure	5.84	49.22	21.35	5.04	4.93	2.30	2.75	1.10	1.3
Premier Brand Pulverized Sheep Manure	5.26	54.41	12.22	3.36	1.65	4.10	1	2.06	2
Pulverized Manure Co., Chicago, Ill. Wizard Brand Pulverized Sheep Manure	6.05	55.09	14.19	1.96	2	1.78	1	4.46	2
Rogers & Hubbard Co. Sheep & Goat Manure.....	8.52	40.87	21.73	1.78	1.25	1.22	0.75	4.30	2

Premier Brand Pulverized Poultry Manure failed to meet its guaranty, being low in phosphoric acid and just within tolerance limits in potash, the shortage in total plant food being six percent.

Excessive amounts of insoluble matter (sand) were found in the first two brands listed. Tonnage sales have dropped about half since 1930. The cost per pound of plant food is very high but the humus content may be considered of some value.

Sheep manures are very uneven in composition. During the past 10 years four brands now selling in the state have varied considerably with respect to analysis, which often has had little relation to guaranty. In three of these four brands the potash guaranty has been consistently very much understated. A brand of pulverized poultry manure has run more evenly and its guaranty is more nearly indicative of its actual composition.

Referring to the next table it will be noted that 11 of the 19 limes and limestones registered were analyzed. Apparently six registrants either made no sales or sold only small amounts. The product registered by H. E. Millard of Annville, Pa., a package goods sold at chain stores, is somewhat low in calcium oxide. The Vermarco Agricultural Limestone is low in calcium oxide but maintains its guaranty in combined carbonates.

V. LIMES AND LIMESTONES

Manufacturer and Brand	Lime (CaO) found	Lime (CaO) guaranteed	Magnesia (MgO) found	Magnesia (MgO) guaranteed	Total carbonates (CaCO ₃ + MgCO ₃) found	Total carbonates (CaCO ₃ + MgCO ₃) guaranteed	Insoluble matter SiO ₂	Mechanical Analysis				
								Percentage passing 20-mesh sieve	Percentage passing 40-mesh sieve	Percentage passing 60-mesh sieve	Percentage passing 80-mesh sieve	Percentage passing 100-mesh sieve
Hydrated Limes												
Brewer & Co., Inc., Worcester, Mass.												
Brewers' Sure Crop Agricultural Hydrated Lime	67.69	60	0.88	1	23.52	..	1.04	..	..	..	..
Producto Agricultural Lime.....	66.50	60	3.68	1	34.03	..	4.78	..	..	..	..
Fonda Lime Kilns, St. Albans, Vt.												
Fonda Agricultural Lime.....	73.51	60	1.64	0.5	12.78	..	1.54	..	..	..	..
H. E. Millard, Annville, Pa.												
Sweet-Arrow Hydrated Lime.....	66.95	70	2.24	1.5	18.20	..	0.68	..	..	..	..
Swanton Lime Works, Swanton, Vt.												
Agricultural Lime.....	66.64	60	1.32	0.3	18.33	..	1.07	..	..	..	..
Vermarco Lime Co., West Rutland, Vt.												
Vermarco Agricultural Hydrated Lime.....	69.14	68	3.96	1	9.87	..	1.81	..	..	..	..
Ground Limestones												
American Agricultural Chemical Co., North Weymouth, Mass.												
Pownal Agricultural Limestone.....	45.73	45	5.90	5	93.94	90	6.22	100	97	84	79 76	
Brewer & Co., Inc., Worcester, Mass.												
Producto Agricultural Limestone.....	51.71	40	2	1	79.73	90	5.53	100	90	79	73 72	
Eastern States Farmers' Exc., Springfield, Mass.												
Eastern States Pulverized Limestone.....	52.96	52	0.92	0.5	96.43	94	3.44	99	83	76	70 69	
Vermarco Lime Co., West Rutland, Vt.												
Vermarco Agricultural Limestone Pulverized....	52.39	54	1.32	1	96.28	96	4.01	100	94	86	75 72	
Lime Ashes												
Brewer & Co., Inc., Worcester, Mass.												
Lime Kiln Ashes.....	48.28	42	3.92	2	42.31	..	10.86	..	..	..	..

RESULTS OF FERTILIZER INSPECTION

(a) AS TO QUANTITY OF PLANT FOOD

The 91 brands of mixed goods analyzed in 1934 were, as a whole, better than those of last year, as is shown in tables I and III on pages 5 to 8. Only 13 of the 272 guaranties, or less than five percent, were not maintained. The 1933 figure was six percent. Three of these shortages amounted to less than 0.25 percent, one was between 0.25 and 0.50 percent, seven were above 0.50 percent but less than one percent and two exceeded one percent. The distribution was as follows: Nitrogen four, total phosphoric acid one, available phosphoric acid one and potash seven. Only nine of the 91 brands failed to meet their guaranties and only six showed a shortage of total plant food, ranging from one to 11 percent. This is a very satisfactory showing.

Special mention should be made of Standard Wholesale Phosphate & Acid Works' U. S. 8/16/14 which is 1.10 percent low in nitrogen, 0.48 low in available phosphoric acid and 2.65 percent low in potash, representing a total plant food shortage of 11 percent. Their muriate of potash is 1.7 percent below its potash guaranty, representing a plant food shortage of four percent. Soil-Prep, manufactured by Tennessee Corporation, was 0.68 percent low in available phosphoric acid, representing a plant food shortage of three percent. All shortages beyond tolerance limits are printed in bold face type.

Taking each brand analyzed as a unit in the computation, regardless of the amount sold, 4.88 percent nitrogen was guaranteed and 5.06 percent furnished; 9.12 percent available phosphoric acid was guaranteed and 9.69 percent furnished; 7.18 percent potash was guaranteed and 7.51 percent furnished. 0.18 percent more nitrogen, 0.57 percent more available phosphoric acid, and 0.33 percent more potash was furnished than was guaranteed. For each 100 pounds of plant food guaranteed 105 pounds were furnished. The 30 brands of crude stock, with five exceptions, equalled or exceeded the guaranties made in their behalf (tables II and III, pages 8, 9). The Vermont consumer almost always received as much or more plant food than he bought. The following efficiency table shows the average overruns and under-runs of the several manufacturers.

EFFICIENCY TABLE

	Brands	Brands meeting guaranty in all respects	Total guaranties	Guaranties made good	Guaranties not fulfilled	0.11-0.25% below	0.25-0.50% below	0.50-1% below	More than 1% below	Average overrun over guaranty		
										Nitrogen	Available phosphoric acid	Potash
Acme Guano Co.	4	3	12	11	1	1	..	..	..	0.09	0.71	0.34
American Agricultural Chemical Co. 17	17	17	51	51	..	..	..	..	..	0.08	0.26	0.49
Apothecaries Hall Co.	1	1	3	3	..	..	..	..	..	0.16	0.24	0.35
Armour Fertilizer Works.	5	5	15	15	..	..	..	..	..	0.03	0.34	0.12
Consolidated Rendering Co. and subsidiary ..	18	18	54	54	..	..	..	..	..	0.12	0.44	0.31
Eastern States Farmers' Exchange..	10	9	29	28	1	..	..	1	..	0.51	0.78	0.78
Thomas W. Emerson Co.	1	1	3	3	..	..	..	..	..	0.42	4.02	1.14
Howard Hardware Co.	1	..	3	2	1	..	..	1	..	0.48	0.92	-0.87
International Agricultural Corp.	3	3	9	9	..	..	..	..	..	0.12	0.31	-0.09
J. O. Middlebrook & Sons.	1	1	3	3	..	..	..	..	..	0.39	0.78	0.18
Miller Fertilizer Co.	2	1	6	4	2	..	1	1	..	-0.20	0.90	0.19
Old Deerfield Fertilizer Co., Inc.	8	6	24	21	3	1	..	1	1	0.34	0.88	-0.25
Olds & Whipple, Inc.	1	1	3	3	..	..	..	..	..	0.34	0.10	0.30
Rogers & Hubbard Co.	9	9	27	27	..	..	..	..	..	0.23	0.61	0.52
Standard Wholesale Phosphate & Acid Works ..	6	4	18	14	4	..	1	1	2	-0.08	0.27	-0.34
Stimulant Laboratories, Inc.	1	1	3	3	..	..	..	..	..	0.28	2.56	4.50
Swift & Co.	1	1	3	3	..	..	..	..	..	0.23	0.88	0.33
Tennessee Corp.	2	1	6	5	1	..	..	1	..	0.12	0.02	0.27
Totals and averages*.....	91	82	272	259	13	2	2	6	3	0.20	0.83	0.46

* Of 18 companies, each a unit.

A review of the trade for the past 10 years in mixed fertilizers seems worth while.

BRANDS OF MIXED FERTILIZER LICENSED AND ANALYZED 1925-1934

	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934
Licensed	122	116	140	115	137	138	152	160	125	111
Collected	100	103	118	98	108	116	131	134	110	91
Not found on sale.....	22	13	23	17	29	22	21	26	15	20

The approximate average guaranteed composition of fertilizers sold during the 10 years—each brand taken as a unit—is shown below.

	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934
Nitrogen	3	3½	3½	3½	3¼	3¾	4½	4½	5½	4¾
Available phosphoric acid	8	8½	8½	8¾	8¾	10	10	10	9½	9½
Potash	5½	5¾	6	6½	6	6¾	7½	7	7½	7¼
Total plant food*..	16½	17½	17½	18¼	18	21¼	21½	21½	22½	21¾

* Nitrogen, available phosphoric acid, potash.

The average guaranteed composition of the average mixed fertilizer sold in Vermont this year is lower than that sold in 1933. The average total plant food purveyed has gradually increased up to last year. This has been due to the elimination of the low grades and the increased numbers of double strength formulas used. This year the average total plant food figure slightly decreased because several of the higher grades have not been on the market. The percentage of deficiencies is one percent less than last year and, on the whole, the mixed goods are quite as good as they have been of late years—perhaps a bit better. The overruns are a trifle larger, the consumer thus getting a little more than he pays for.

DEFICIENCIES (MIXED FERTILIZERS)

	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934
Analyzed	100	103	118	98	108	116	131	134	110	91
Up to guaranty.....	88	82	96	77	91	106	107	116	95	82
Deficient	12	21	22	21	17	10	24	18	15	9
Percentage of deficiency....	12	20	19	22	16	9	18	13	14	10

(b) AS TO QUALITY OF PLANT FOOD

Organic Nitrogen Availability.—When the activity of insoluble organic nitrogen is 50 percent or more by the alkaline permanganate and 80 percent or more by the neutral permanganate method it is deemed to be of good quality. These dicta are applicable only to mixed goods containing at least 0.3 percent of water-insoluble nitrogen. Fifty-eight brands carried less than this and were held to be of good quality. The remaining 32 brands are grouped as follows:

- 2 brands, below 50 percent activity
- 6 brands, between 50-55 percent activity
- 11 brands, between 55-65 percent activity
- 13 brands, between 65-80 percent activity

Two brands contained insoluble organic nitrogen of inferior quality, namely Eastern States 12/16/12 and 4/8/8, manufactured by the Eastern States Farmers' Exchange. However, they contained more than enough nitrogen of high quality to meet their guaranties; hence no harm and no damage was done by the use of a somewhat inert conditioner.

Of the 90 brands of mixed fertilizer which contained nitrogen, 58 (64 percent) carried less than 0.3 percent of insoluble organic nitrogen against 64 (58 percent) last year. Seven percent were in the 50-55 percent class, 12 percent in the 55-65 percent class, 14 percent in the 65-80 percent class. The 1933 comparable figures were 6, 9 and 25

percents. Less organic nitrogen is being used each year for the reason that good organics are costly and scarce.

Availability of Phosphoric Acid; Forms of Potash.—Most mixed goods now carry little insoluble phosphoric acid, a highly commendable state of affairs. All but eight of the brands carried their potash solely as muriate; the others contained more or less nitrate and sulphate.

FERTILIZER USAGE IN VERMONT

The following table shows the total tonnage, that of the several crude stocks, and of the different grades sold during the years 1927-1933. Complete reports for 1934 are not in hand as this bulletin is being issued, hence their omission. Grades are grouped from the lowest percentage of nitrogen to the highest so that one can note the relative popularity of each type. Superphosphate still holds first place. The low grades (14 percent total plant food) have disappeared from the market. The following grades of mixed fertilizer were most largely sold during 1932 and 1933: 3/10/4, 4/8/4, 4/8/7, 4/12/4, 4/8/10, and 5/8/7, their combined tonnages representing nearly one-half of the total amount sold.

	1927	1928	1929	1930	1931	1932	1933	1933
Total tonnages	15,663	16,911	14,905	16,069	15,031	11,767	9,457	%
Superphosphate	3,298	3,819	2,935	3,571	2,368	1,838	1,698	18.0
Nitrate of soda.....	248	222	253	258	226	180	103	1.1
Sulphate of ammonia.....	215	221	154	140	64	105	63	0.7
Bone and tannage.....	189	179	120	158	65	103	109	1.1
Muriate of potash.....	126	127	82	227	92	98	32	0.3
Sheep, goat and poultry..	167	135	202	227	181	160	115	1.2
1/9-10/3-4	565	721	700	517	419	...	...	..
2/8/2	796	158	503	437	358	...	...	..
2/9-10/2-4	963	765	373	179	275	534	330	3.5
2/12/2-4	171	224	436	426	320	290	196	2.1
2/8/10	1,479	1,446	1,188	1,279	1,102	769	556	5.9
3/8/4	1,251	1,092	1,227	1,296	1,407	...	...	..
3/10-12/3-6	724	688	546	676	587	1,364	1,075	11.4
4/8/4	674	706	765	900	691	606	705	7.4
4/8/7	601	403	130	63	337	624	622	6.6
4/6/10	1,023	1,700	1,105	1,404	1,683	...	...	..
4/10-12/4-6 .....	...	9	639	799	585	1,227	414	4.4
4/8/10	303	326	...	...	...	1,156	904	9.6
5/8/7	793	779	1,024	1,005	1,575	590	697	7.4
6/6-8/4-6	150	114	222	201	121	36	37	0.4
7/6-8/5-6	138	210	238	249	268	291	278	2.9
8/6/6	148	200	153	139	116	...	...	..
8-10/16-30/14-20	730	1,043	456	587	635	499	477	5.0
Miscellaneous	911	1,624	1,454	1,331	1,556	1,297	1,046	11.0

The percentages of the different classes of fertilizers sold, based on tonnage sales for the past five years are set forth below.

	1929	1930	1931	1932	1933
Brands carrying 14-15% plant food.....	19.2%	16.9%	16.4%	5.6%	3.5%
Brands carrying 16-18% plant food.....	20.3	19.7	18.8	17.7	19.0
Brands carrying 19-24% plant food.....	30.8	28.6	37.0	47.3	42.6
Brands carrying 25-31% plant food.....	.5	.2	.2	1.1	.7
Brands carrying 32-44% plant food.....	3.7	5.9	6.9	4.4	7.9
Brands carrying 45% plant food.....	.4	.1	1.4	1.7	.4
Superphosphate	19.7	22.3	15.8	15.6	18.0
Crude stocks (other than superphosphate).	4.0	4.9	2.3	5.4	6.7
Sheep, goat and poultry.....	1.4	1.4	1.2	1.2	1.2

The trend of the trade in Vermont is still towards the use of higher grades. The brands guaranteed to carry between 16 and 18 percent and from 32 to 44 percent plant food have increased somewhat in numbers and in apparent popularity, while those guaranteed to carry between 19 and 24 percent have decreased. Crude stock usage remains about the same. A 20 percent tonnage drop occurred in 1933 as compared to 1932.

FERTILIZER GRADES

The figures in the subjoined table show that the grades carrying 20, 19, 22-24 and 16 units were the most numerous among those found on sale. Only six of the 91 brands analyzed carried less than 15 units. The extremely high grade, 47 percent or above goods, has nearly disappeared from the market. Only one brand guaranteed to contain more than 38 percent plant food was found on sale this year, whereas last year five such were found.

DISTRIBUTION OF GRADES AMONG MANUFACTURERS

	Total	14% and +	47-63%	38-44%	26-32%	22-24%	21%	20%	19%	18%	17%	16%	15%	14%	8%
Acme Guano Co.....	4	4	.	.	.	1	.	1	1	.	.	.	1	.	.
American Agricultural Chemical Co.....	17	17	.	1	.	4	.	3	4	.	2	2	.	1	.
Apothecaries Hall Co.....	1	1	.	.	.	.	.	.	.	.	.	1	.	.	.
Armour Fertilizer Works.....	5	5	.	1	.	1	.	1	1	.	.	1	.	.	.
Consolidated Rendering Co. and subsidiary	18	18	.	1	1	3	.	4	3	.	2	2	.	2	.
Eastern States Farmers' Exchange	10	10	.	3	1	.	.	6	.	.	.	.	.	.	.
Thomas W. Emerson Co.....	1	1	.	.	.	.	.	.	.	.	.	.	.	1	.
Howard Hardware Co.....	1	1	.	.	.	.	.	1	.	.	.	.	.	.	.
International Agricultural Corp.	3	3	.	.	.	1	.	1	.	.	.	1	.	.	.
J. O. Middlebrook & Sons....	1	1	.	.	.	.	.	1	.	.	.	.	.	.	.
Miller Fertilizer Co.....	2	2	.	.	.	.	.	1	.	.	.	1	.	.	.
Old Deerfield Fertilizer Co., Inc.	8	8	1	.	.	1	.	2	3	.	.	1	.	.	.
Olds & Whipple, Inc.....	1	1	.	.	.	.	.	1	.	.	.	.	.	.	.
Rogers & Hubbard Co.....	9	9	.	.	.	1	.	3	2	1	.	2	.	.	.
Standard Wholesale Phosphate & Acid Works.....	6	6	.	1	.	1	.	1	1	.	.	1	.	1	.
Stimuplant Laboratories, Inc..	1	1	.	1	.	.	.	.	.	.	.	.	.	.	.
Swift & Co.....	1	1	.	.	.	.	.	1	.	.	.	.	.	.	.
Tennessee Corp.	2	1	.	.	.	.	.	.	1	.	.	.	.	.	1*
Totals	91	90	1	8	2	13	.	24	19	1	4	12	1	5	1

* Soil-Prep. 4/2/2.

The following table sets forth on a percentage basis the situation as to grades during the past 10 years:

	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934
	%	%	%	%	%	%	%	%	%	%
9-11 percent total plant food..	3	0	0	0	0	0	0	0	1	1
12-13 percent total plant food..	17	12	6	4	4	4	4	0	0	0
14-15 percent total plant food..	13	19	23	21	21	18	16	10	7	7
16-17 percent total plant food..	18	14	12	13	13	12	12	17	17	17
18-19 percent total plant food..	15	16	16	16	14	11	11	19	21	21
20 or more percent total plant food	34	39	43	46	48	55	57	54	54	54

THE COST OF A POUND OF PLANT FOOD IN THE VARIOUS GRADES

	Total pounds plant food in 100 pounds	Total pounds plant food in a ton	Approximate average cost per ton	Average cost per pound plant food
High analysis.....	14	280	\$31	11.1 cts.
High analysis.....	16	320	34	10.6 "
High analysis.....	18	360	40	11.1 "
High analysis.....	20	400	35	8.8 "
High analysis.....	22	440	39	8.9 "
High analysis.....	40	800	52	6.5 "

PRICE DATA

COMPARISONS BETWEEN 1933 AND 1934 TON PRICES

Grade	'33	'34	Grade	'33	'34	Grade	'33	'34
2/10/ 2	\$27	\$31	4/ 8/ 7	\$32	\$39	8/16/14	\$48	\$59
2/ 8/10	33	35	4/ 8/10	35	39	8/16/16	50	52
2/12/ 4	32	40						
3/10/ 4	30	37	4/12/ 4	32	30			
3/10/ 6	35	35	5/ 8/ 7	35	41			
			5/ 8/10	34	41			
4/ 8/ 4	30	34	6/ 8/ 6	33	32			
			7/ 6/ 6	37	42			

TEN-YEAR AVERAGES

	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934
Approximate average retail prices	\$46	\$47	\$42	\$42	\$44	\$44	\$45	\$36	\$34	\$39
Approximate average pounds plant food per ton	327	350	353	365	360	435	433	432	453	424
Approximate average price per pound of plant food	14.1c	13.4c	11.9c	11.5c	12.2c	10.1c	10.4c	8.4c	7.5c	9.2c
Percentage of pre-war prices	139	132	117	113	120	100	102	86	77	94
Percentage of 1916 prices	101	96	85	82	87	72	73	60	54	66

In the last three tables the writers have tried to set forth as accurately as might be the present cost of fertilizers to Vermont consumers. Prices are obtained by sampling agents during April and May directly from local selling agents. It is fair to assume that they represent the condition of the market. The average cost per pound of total plant food in the different grades ranges from 11.1 to 6.5 cents. Those carrying from 14 to 18 pounds cost nearly 30 percent more per pound of plant food than those which carried larger amounts.

The second table compares the cost of the various grades in 1933 and 1934. In all but two cases the 1934 price was higher than that of last season.

The average 1934 ton price is about five dollars higher than last year. Since the average guaranty has fallen off slightly the average cost of plant food is greater.