

Kansas State Agricultural College.
EXPERIMENT STATION.—Bulletin 187.

W. M. JARDINE, *Director.*

FARM BULLETIN.

Department of Chemistry.

J. T. WILLARD, *Chemist in Charge.*



Analyses of Registered Fertilizers.

BY

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MANHATTAN, KAN

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Department of Chemistry.

- J. T. WILLARD., Chemist in Charge.
- C. O. SWANSON. First Assistant in Chemical Investigations.
- J. W. CALVIN..... Assistant in Animal Nutrition.
- R. C. WILEY Assistant in Feed and Fertilizer Control.
- C. E. MILLAR. Assistant in Soil Analysis.

Work of the Department of Chemistry.

A large part of the work of the Department of Chemistry in the Experiment Station is in cooperation with other departments, by contributing the chemist's point of view in planning experiments, and in making the chemical analyses incident to investigations. Among these investigations are: Experiments in animal nutrition conducted by President Waters and the Department of Animal Husbandry; experiments conducted by the Department of Dairy Husbandry; experiments touching soil fertility, in charge of the Department of Agronomy; experiments in poultry nutrition in cooperation with the Department of Poultry Husbandry.

Among the lines of work more completely in charge of the Department of Chemistry are certain experiments touching the composition, digestibility and nutritive value of feeds; chemical investigations of wheat and flour; the collection and analysis of samples of soils, typical of the various regions of the state; the inspection and analysis of fertilizers sold in the state and the analysis of feeding stuffs sold in the state.

Bulletins are issued from time to time as required, or as the results of investigations warrant. These may be obtained without charge by addressing the Director of the Experiment Station, Manhattan, Kan.

Analyses of Registered Fertilizers.

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The following pages include a report of the results of analyses of inspection samples of fertilizers made since those reported in bulletin No. 169, also a list of dealers in this state who are handling the registered fertilizers. It has also been deemed advisable to present a complete statement of the receipts and expenditures for the entire period that the law has been in operation. The expenditures have been made in the purchase of apparatus and chemicals required in the work, and to defray the expense of inspection of the fertilizers on sale, and the collection of samples for analysis, and in paying other expenses involved in making the analyses.

The original act provided that any excess of receipts remaining after making the necessary expenditures in enforcing the law might be applied to paying the expense of the Agricultural Experiment Station. In harmony with this provision, a part of the receipts were used in paying the expenses incident to collecting samples of soils in beginning a soil survey of the state, and it is proposed to continue to apply to that work such surplus as may accrue from year to year. It will be noted that the total receipts for the five years and three months included in this report are but \$4419, or about \$800 per annum.

FINANCIAL STATEMENT.

October 1, 1907, to December 31, 1912.

RECEIPTS.

1907			
1	Oct. 3	Armour Packing Co., Kansas City, Mo., tax tags.....	\$50.00
2	Oct. 22	Armour Packing Co., Kansas City, Mo., registration fees.....	150.00
3	Oct. 28	Hull & Dillon Packing Co., Pittsburg, Kan., registration fee.....	25.00
	Oct. 28	Hull & Dillon Packing Co., Pittsburg, Kan., tax tags.....	5.00
1908			
4	Jan. 7	Swift & Co., Chicago, Ill., registration fees.....	150.00
4	Jan. 7	Swift & Co., Chicago, Ill., tax tags.....	81.59
5	Feb. 28	Armour & Co., Kansas City, Mo., tax tags.....	100.00
6	Mar. 3	Swift & Co., St. Joseph, Mo., tax tags.....	10.00
7	May 6	Empire Carbon Works, St. Louis, Mo., registration fees.....	50.00
8	Jun. 10	The Stanton Lindburg Packing Co., Pittsburg, Kan., reg. fee.....	25.00
	Jun. 10	The Stanton Lindburg Packing Co., Pittsburg, Kan., tax tags.....	5.00
9	Jul. 31	Swift & Co., So. St. Joseph, Mo., tax tags.....	25.00
10	Sep. 3	Armour Packing Co., Kansas City, U. S. A., tax tags.....	100.00
11	Sep. 12	Armour Packing Co., Kansas City, Mo., tax tags.....	200.00
12	Sep. 14	Swift & Co., Kansas City, Kan., tax tags.....	25.00
18	Sep. 18	Swift & Co., Kansas City, Kan., tax tags.....	25.00
14	Oct. 4	Swift & Co., Kansas City, Kan., tax tags.....	25.00
1909			
15	Jan. 29	Am. Fert. and Reduction Co., Kansas City, Mo., registration fee.....	25.00
	Jan. 29	Am. Fert. and Reduction Co., Kansas City, Mo., tax tags.....	5.00
16	Mar. 1	Swift & Co., Kansas City, Kan., tax tags.....	25.00
17	Mar. 22	Swift & Co., Kansas City, Kan., tax tags.....	75.00
18	Mar. 22	Swift & Co., St. Joseph, Mo., tax tags.....	25.00
19	Apr. 27	Swift & Co., Chicago, Ill., registration fee.....	25.00
20	Jul. 16	Swift & Co., Chicago, Ill., tax tags.....	45.00
21	Jul. 26	Swift & Co., St. Joseph, Mo., tax tags.....	50.00
22	Jul. 31	Swift & Co., Fort Worth, Tex., tax tags.....	40.00
23	Aug. 26	Empire Carbon Works, St. Louis, Mo., registration fee.....	25.00
	Aug. 26	Empire Carbon Works, St. Louis, Mo., tax tags.....	15.00
24	Aug. 30	Am. Red. and Fertilizer Co., Kansas City, Mo., reg. fees.....	50.00
25	Sep. 1	Armour Packing Co., Kansas City, Mo., tax tags.....	100.00
26	Sep. 2	Empire Carbon Works, St. Louis, Mo., tax tags.....	50.00
27	Sep. 2	Am. Red. and Fertilizer Co., Kansas City, Mo., tax tags.....	25.00
28	Sep. 13	Am. Red. and Fertilizer Co., Kansas City, Mo., tax tags.....	25.00
29	Sep. 13	Empire Carbon Works, St. Louis, Mo., tax tags.....	12.50
30	Sep. 28	Swift & Co., St. Joseph, Mo., tax tags.....	50.00
31	Sep. 28	Hull & Dillon Packing Co., Pittsburg, Kan., tax tags.....	5.00
1910			
32	Jan. 7	Am. Red. and Fertilizer Co., Kansas City, Mo., tax tags.....	12.50
33	Mar. 3	Swift & Co., Kansas City, Kan., tax tags.....	125.00
34	Mar. 7	Am. Red. and Fertilizer Co., Kansas City, Mo., tax tags.....	25.00
35	Apr. 12	New Orleans Acid and Fert. Co., New Orleans, La., reg. fee.....	25.00
	Apr. 12	New Orleans Acid and Fert. Co., New Orleans, La., tax tags.....	5.00
36	Sep. 1	Armour Fertilizer Works, Kansas City, Kan., tax tags.....	100.00
37	Aug. 27	Am. Red. and Fertilizer Co., Kansas City, Mo., tax tags.....	25.00
38	Sep. 1	Hull & Dillon Packing Co., Pittsburg, Kan., tax tags.....	12.50
39	Sep. 12	Empire Carbon Works, St. Louis, Mo., tax tags.....	150.00
40	Sep. 14	Am. Red. and Fertilizer Co., Kansas City, Mo., tax tags.....	25.00
41	Oct. 10	Swift & Co., So. St. Joseph, Mo., tax tags.....	25.00
42	Nov. 7	German Kali Works, Baltimore, Md., registration fees.....	75.00
43	Dec. 29	Swift & Co., So. St. Joseph, Mo., tax tags.....	100.00
1911			
44	Feb. 14	Empire Carbon Works, St. Louis, Mo., tax tags.....	50.00
45	Mar. 9	Empire Carbon Works, St. Louis, Mo., registration fee.....	25.00
46	Mar. 22	Cudshy Packing Co., Kansas City, Kan., Wichita, Kan., So. Omaha, Neb., Sioux City, Iowa, registration fee.....	25.00
47	Apr. 5	Empire Carbon Works, St. Louis, Mo., registration fee.....	25.00
	Apr. 5	Empire Carbon Works, St. Louis, Mo., tax tags.....	25.00
48	Apr. 24	Swift & Co., Kansas City, Kan., tax tags.....	37.50
49	May 13	Am. Red. and Fertilizer Co., Kansas City, Mo., tax tags.....	25.00
50	Aug. 8	Swift & Co., Kansas City, Kan., tax tags.....	50.00
51	Aug. 24	Swift & Co., So. St. Joseph, Mo., tax tags.....	125.00
52	Aug. 26	Empire Carbon Works, St. Louis, Mo., tax tags.....	125.00
53	Sep. 1	Hirsh, Stein & Co., Chicago, Ill., registration fees.....	50.00
	Sep. 1	Hirsh, Stein & Co., Chicago, Ill., tax tags.....	10.00

RECEIPTS—concluded.

1911			
54	Sep. 7	Hirsh, Stein & Co., Chicago, Ill., tax tags	\$10.00
54	Sep. 7	Hirsh, Stein & Co., Chicago, Ill., tax tags	10.00
55	Sep. 8	Swift & Co., So. St. Joseph, Mo., tax tags	125.00
56	Sep. 8	Armour Fertilizer Works, Kansas City, Kan., tax tags	100.00
57	Sep. 13	Am. Red. and Fertilizer Co., Kansas City, Mo., tax tags	25.00
58	Sep. 18	Hirsch, Stein & Co., Chicago, Ill., tax tags	15.00
59	Oct. 10	Am. Red. and Fertilizer Co., Kansas City, Mo., tax tags	17.50
1912			
60	Feb. 7	Empire Carbon Works, St. Louis, Mo., tax tags	25.00
61	Feb. 16	Swift & Co., So. St. Joseph, Mo., tax tags	125.00
62	Feb. 28	Swift & Co., Kansas City, Kan., tax tags	50.00
63	Mar. 13	Empire Carbon Works, St. Louis, Mo., registration fee	25.00
64	Mar. 21	Armour Fertilizer Works, Kansas City, Kan., tax tags	100.00
65	Jul. 17	Armour Fertilizer Works, Kansas City, Kan., tax tags	100.00
66	Aug. 5	Sulzberger & Sons Co., Kansas City, Kan., tax tags	25.00
67	Aug. 10	Empire Carbon Works, St. Louis, Mo., tax tags	125.00
68	Aug. 16	Empire Carbon Works, St. Louis, Mo., registration fee	25.00
69	Aug. 16	Swift & Co., Kansas City, Kan., tax tags	25.00
70	Aug. 16	Armour & Co., Kansas City, Mo., registration fees	50.00
71	Aug. 20	Swift & Co., So. St. Joseph, Mo., tax tags	125.00
72	Aug. 29	Sulzberger & Sons Co., Chicago, Ill., registration fees	50.00
73	Sep. 11	American Reduction and Fertilizer Co., tax tags	25.00
74	Sep. 11	Swift & Co., So. St. Joseph, Mo., tax tags	125.00
75	Sep. 23	Swift & Co., So. St. Joseph, Mo., tax tags	125.00
Total receipts			\$4,419.00

DISBURSEMENTS.

1908		
Oct. 12	E. L. Sieber, Manhattan, Kan., traveling expenses	\$40.18
Nov. 5	E. L. Sieber, Manhattan, Kan., traveling expenses	33.66
Dec. 10	E. L. Sieber, Manhattan, Kan., traveling expenses	31.91
1909		
Jan. 6	E. L. Sieber, Manhattan, Kan., traveling expenses	36.62
Mar. 15	R. C. Wiley, Manhattan, Kan., traveling expenses	36.86
Mar. 24	R. C. Wiley, Manhattan, Kan., traveling expenses	18.21
Apr. 30	J. Bishop & Co., Malvern, Pa., platinum	545.40
May 12	R. C. Wiley, Manhattan, Kan., traveling expenses	69.16
Jun. 14	R. C. Wiley, Manhattan, Kan., traveling expenses	12.59
Jun. 14	R. C. Wiley, Manhattan, Kan., traveling expenses	36.36
1910		
Mar. 4	R. C. Wiley, Manhattan, Kan., traveling expenses	93.72
Mar. 31	R. C. Wiley, Manhattan, Kan., traveling expenses	49.73
Apr. 2	R. C. Wiley, Manhattan, Kan., traveling expenses	11.65
Jan. 30	C. O. Swanson, Manhattan, Kan., traveling expenses	21.58
Jun. 30	H. C. McLean, Manhattan, Kan., traveling expenses	10.93
Aug. 9	Margaret Butterfield, Manhattan, Kan., labor pay roll	49.62
Aug. 15	C. O. Swanson, Manhattan, Kan., traveling expenses	39.27
Sep. 8	Margaret Butterfield, Manhattan, Kan., labor pay roll	90.21
Oct. 10	Margaret Butterfield, Manhattan, Kan., freight	.46
Nov. 12	C. O. Swanson, Manhattan, Kan., traveling expenses	47.48
Nov. 18	R. C. Wiley, Manhattan, Kan., traveling expenses	26.45
Dec. 23	R. C. Wiley, Manhattan, Kan., traveling expenses	19.83
1911		
Feb. 4	R. C. Wiley, Manhattan, Kan., traveling expenses	118.73
Mar. 9	Margaret Butterfield, Manhattan, Kan., labor pay roll	13.57
Apr. 4	Margaret Butterfield, Manhattan, Kan., labor pay roll	6.00
Apr. 4	Margaret Butterfield, Manhattan, Kan., labor pay roll	20.21
Apr. 4	R. C. Wiley, Manhattan, Kan., traveling expenses	35.01
May 5	Margaret Butterfield, Manhattan, Kan., labor pay roll	12.00
May 5	Margaret Butterfield, Manhattan, Kan., labor pay roll	34.45
May 5	Margaret Butterfield, Manhattan, Kan., freight	5.80
May 5	J. T. Baker Chem. Co., Phillipsburg, N. J., sodium peroxide	6.65
May 5	L. R. Eakia, Manhattan, Kan., towels, jars and cheesecloth	3.45
May 5	Simpson & Wilson, Manhattan, Kan., shaker machine	74.47
May 5	J. D. Rickman, Manhattan, Kan., printing blanks	2.07
Jun. 5	Margaret Butterfield, Manhattan, Kan., labor pay roll	2.40
Jun. 5	Margaret Butterfield, Manhattan, Kan., labor pay roll	23.04
Jun. 5	Margaret Butterfield, Manhattan, Kan., freight	.25
Jun. 5	Bemis Bros. Bag Co., Kansas City, Mo., bags	11.25
Jun. 5	J. T. Willard, Manhattan, Kan., apparatus and chemicals	17.53
Jun. 30	Margaret Butterfield, Manhattan, Kan., labor pay roll	25.05
Jun. 30	Margaret Butterfield, Manhattan, Kan., freight	3.24
Jun. 30	C. O. Swanson, Manhattan, Kan., traveling expenses	99.22
Jun. 30	Correll Mfg. Co., Manhattan, Kan., counter sink and shelves	32.65
Jun. 30	G. E. Bray, Manhattan, Kan., boxes for shaking machine	4.30
Jul. 20	Margaret Butterfield, Manhattan, Kan., labor pay roll	72.18

DISBURSEMENTS—concluded.

1911		
Aug. 8	Margaret Butterfield, Manhattan, Kan., freight	\$1.86
Aug. 8	Margaret Butterfield, Manhattan, Kan., freight	1.86
Aug. 20	Margaret Butterfield, Manhattan, Kan., labor pay roll	73.36
Sep. 20	Margaret Butterfield, Manhattan, Kan., labor pay roll	37.05
Oct. 17	Eimer & Amend, New York, N. Y., chemicals	58.48
Oct. 17	C. E. Millar, Manhattan, Kan., traveling expenses	11.59
Oct. 17	C. O. Swanson, Manhattan, Kan., traveling expenses	16.69
Oct. 20	Margaret Butterfield, Manhattan, Kan., labor pay roll	59.18
Nov. 9	Correll Mfg. Co., Manhattan, Kan., laboratory tables and hood	363.50
Nov. 20	Imperial Brush Co., Ridgefield Park, N. J., brushes	13.00
Nov. 20	Margaret Butterfield, Manhattan, Kan., labor pay roll	48.17
Dec. 15	Correll Mfg. Co., Manhattan, Kan., laboratory table and wash table	57.50
Dec. 19	Simpson Machine Shop, Manhattan, Kan., work on grinder	1.05
Dec. 19	B. F. Eyer, for E. E. Dept., Manhattan, Kan., electric-light globes	7.05
1912		
Jan. 10	Margaret Butterfield, Manhattan, Kan., freight	29.85
Mar. 7	Margaret Butterfield, Manhattan, Kan., express	2.10
Mar. 16	Eimer & Amend, New York, N. Y., burners	83.20
Mar. 8	Standard Oil Co., Kansas City, Mo., gasoline	87.78
Mar. 8	United Zinc and Chem. Co., Kansas City, Kan., acid	1.82
Apr. 5	Margaret Butterfield, Manhattan, Kan., freight	1.72
Apr. 5	G. E. Bray, for Shops Dept., Manhattan, Kan., sinks, hot plates, etc.	40.77
Apr. 20	Margaret Butterfield, Manhattan, Kan., labor pay roll	2.80
May 6	Margaret Butterfield, Manhattan, Kan., freight	7.32
May 8	Grasselli Chem. Co., St. Louis, Mo., acid	36.98
May 8	Troy Laundry Machinery Co., Chicago, Ill., caustic soda	12.60
May 20	R. C. Wiley, Manhattan, Kan., traveling expenses	63.55
May 20	Margaret Butterfield, Manhattan, Kan., labor pay roll	23.10
Jun. 20	Margaret Butterfield, Manhattan, Kan., salaries	315.00
Jun. 20	A. A. Potter, for Shops, Manhattan, Kan., iron rod	.10
Jun. 20	Margaret Butterfield, Manhattan, Kan., labor pay roll	18.47
Jul. 15	Margaret Butterfield, Manhattan, Kan., labor pay roll	68.48
Aug. 15	Margaret Butterfield, Manhattan, Kan., labor pay roll	.09
Sep. 30	Margaret Butterfield, Manhattan, Kan., freight	4.01
Sep. 30	Margaret Butterfield, Manhattan, Kan., labor pay roll	1.70
Oct. 31	Margaret Butterfield, Manhattan, Kan., freight	.75
Nov. 30	Eimer & Amend, New York, N. Y., chemicals and apparatus	76.22
Nov. 30	Margaret Butterfield, Manhattan, Kan., freight	12.35
Dec. 31	Margaret Butterfield, Manhattan, Kan., freight	1.10
Total disbursements		\$3,580.74

Inspection of the account of the receipts from the sale of tax tags shows that the sale of fertilizers in this state is increasing. Apparently there is a marked increase dating from about two years ago. The total amount, however, is small, being less than 5000 tons, apparently, per annum. Doubtless, to a certain extent, fertilizers are purchased outside the state and shipped in, and such use can not be indicated in our accounts. The receipts from registration fees indicate the introduction of new brands of fertilizers and the entrance of other firms into this market.

Attention may be drawn at this point to the fact that the registration fee is paid but once. This insures permanent registration for a given brand. The purpose of the registration fee is to repress the offering of practically the same thing under a variety of names, the only object of which would be to induce a farmer to buy under one name what he would not buy under another. Incidentally, also, the expense of inspection is greatly increased by a multiplicity of brands.

KANSAS DEALERS IN FERTILIZERS.

In accordance with the provisions of the fertilizer law, a list of the firms which handle registered fertilizers in this state is given in the following pages.

Dealers in Brands of Fertilizers Registered by Armour Fertilizer Works, Chicago, Ill., and Kansas City, Kan.

<p>F. H. Porter, Columbus. F. M. Gust, Crestline. A. R. Quigg, Elk City. R. E. Teichgraber, Eureka. Vincent Bros., Girard. E. K. Gibbs, Hallowell. P. J. Morrison & Co., Hillsdale. Dickinson Bros. H. & G. Co., Humboldt. Peterson Brokerage Co., Hutchinson. Hackney & Son, La Harpe.</p>	<p>Barteldes Seed House, Lawrence. J. F. Ward, Linwood. M. Carrier, Lone Elm. E. Conwell, Oneida. L. Belknap, Pittsburg. Wenzel Sicka, Piqua. Ed. Lotz, Salina. Ross Bros., Wichita. W. R. Sloan, Zenda.</p>
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Dealers in Brands of Fertilizers Registered by Swift & Co., Kansas City, Kan., and South St. Joseph, Mo.

<p>Green Bros., Abilene. Symmonds Hardware Co., Admire. R. F. Mitchell, Aliceville. Paul A. Stuewe, Alma. Libby Hardware Co., Altamont. Bevger & Whitney, Anthony. Dunton Hardware Co., Arcadia. Bunnell Imp. & Seed Co., Arkansas City. W. L. Powell, Arkansas City. Estate of Mary Brown, Atchison. Chas. A. Brown, Atchison. Mangelsdorf Bros., Atchison. Paul & Penley, Augusta. B. Meyers, Axtell. Griffith Grain Co., Baileyville. C. A. Liggett & Son, Baldwin. N. H. Fugate, Bartlett. Belle Plaine Imp. Co., Belle Plaine. E. A. & J. M. Cagle, Beloit. C. A. Sprague, Benedict. Adams Hardware Co., Blue Rapids. E. L. Walker, Bonner Springs. J. L. Spencer, Bucyrus. Gibbon & Reid, Burlington. Patrons' Coöperative Ass'n, Cadmus. J. L. Murry, Caldwell. Carbondale Elevator Co., Carbondale. Todd Hardware & Supply Co., Caney. Canton Hdw. & Lbr. Co., Canton. L. C. Adams Merc. Co., Cedarvale. C. A. Tripp, Chanute. Keiso Grain Co., Cherokee. Cherryvale Grain & Lumber Co., Cherryvale. Clifton Hardware Co., Clifton. Rea Patterson Milling Co., Coffeyville. J. B. Rhodes & Son, Colony. E. B. Davis, Columbus. Wagner & Wilder, Concordia. B. Strong Gr. & Coal Co., Conway Springs. Lukens & Sanders, Corning. Alford Hdw. Co., Cottonwood Falls. A. C. Van Camp, Council Grove. Fisher & Hathaway, Council Grove. W. Bowersock, Dearing. Z. Gardner, De Soto. Lewis Taylor, Earleton. A. R. Adams, Easton. J. P. Hall, Easton. W. H. Kelly, Edgerton. Muzzy & Lower, Edna. Stimpson & Ellsberry, El Dorado. J. H. Meyers, Elk City. Hamilton & Root, Elk Falls. H. Dale & Son, Emporia.</p>	<p>W. A. Willis, Emporia. Thos. Scott, Erie. W. A. Wough, Eskridge. E. W. Kraus, Eudora. A. F. Jenne, Eureka. Edgar Johnson, Everest. A. L. Hamm, Fairland. Diaker Lbr. & Grain Co., Fontana. Mead Grain Co., Fort Scott. Wallace Gibbs, Frankfort. Wm. Kelly, Frankfort. Hampton Bros. Milling Co., Fredonia. Fulton Lumber Co., Fulton. B. B. Basore, Galva. Thos. Baxter & Son, Garnett. G. H. Barker, Girard. J. Somerhalder, Gridley. E. E. Teeples, Gridley. Halstead Mfg. & Ele. Co., Halstead. Frizzell & Smith, Halstead. Ferguson & Spence, Hanover. R. E. Thompson, Herington. Anawalt-Campbell Merc. Co., Harper. R. D. Carpenter & Co., Hartford. Adam Lankard, Harris. A. J. Hill, Hiawatha. T. Winzeler, Hilltop. Holton Feed Store, Holton. P. L. Killey Lbr. Co., Horton. Humboldt Mill & Power Co., Humboldt. B. V. Sloan, Huron. Young & Son, Hutchinson. R. B. Trechsel, Idana. Union Imp. & Hdw. Co., Independence. Adam Holle, Inman. G. Z. Price, Inman. T. B. Shannon, Iola. T. B. Rockwell M. & G. Co., Junction City. B. Gellhaus, Kelly. Hensley & Brosius, Kincaid. Summers-Ferguson Imp. Co., Kingman. C. T. Potter, La Cygne. Hampton Bros. Milling Co., Lafontaine. C. L. Wilson & Son, La Harpe. Wm. Sperling, Latham. W. J. Busch Seed Co., Lawrence. Peter Bubb, Leavenworth. John M. Black, Lebo. Stafford Hardware Co., Leonardville. G. W. Ringle, Le Roy. J. M. Nelson & Co., Lindsborg. Matt Grob, Linwood. M. M. Miller, Longton. Inter-State Merc. Co., Louisburg.</p>
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C. B. Fiester, McLouth.
M. Blackman, McPherson.
E. C. Crary, McPherson.
G. E. Shirkey, Madison.
Geo. T. Fielding & Sons, Manhattan.
The Saggan Co., Marion.
Geo. D. Scott, Marion.
J. H. Cavanaugh, Marysville.
J. M. Dick, Melvern.
The Meriden Elevator Co., Meriden.
Miltonvale Grain Co., Miltonvale.
John Hartley, Minneapolis.
W. J. Rumble Lbr. Co., Moran.
W. C. McConell & Co., Morehead.
G. F. Cotter, Mound Valley.
H. G. Torbert, Munden.
Calvert & Beven, Muscotah.
Bauman Grain Co., Neodesha.
The Harris Lbr. Co., Neosho Falls.
F. B. Learned, Neosho Falls.
E. R. Sanner, Newton.
John Mair, Nortonville.
D. R. Steiner, Olathe.
Olivet Elev. & Lbr. Co., Olivet.
Peter Gurtler, Onaga.
Mutual Merc. Ass'n, Opolis.
Osage City Gr. & Elev. Co., Osage City.
Barr Brothers, Osawatomie.
L. Repstine, Oskaloosa.
Oswego Milling Co., Oswego.
Williams-Wilson Grain Co., Ottawa.
A. Willis & Co., Ottawa.
Ira Abildgaard, Oxford.
Fowler Com. Co., Paola.
Parker Hdw. Co., Parker.
C. D. Lynd, Parsons.
A. R. Strowig Imp. Co., Paxico.
Moffett & Co., Peabody.
Thos. Lee, Perry.
Pittsburg Ele. Co., Pittsburg.
J. G. Wilson Lbr. Co., Piqua.
Blaker Lbr. & Grain Co., Pleasanton.
Marshall Bros. & Co., Quenemo.

S. Secrest & Sons, Randolph.
Jere Kimmel, Robinson.
Brynes & Co., St. Marys.
J. P. Feighney, St. Marys.
Pat Diskin, St. Paul.
Pace Transfer Co., Sabetha.
W. H. Roberts, Savonburg.
J. K. & J. O. Tulloss, Sedan.
A. L. L. Scoville, Seneca.
C. D. Resler, Shaw.
C. Heller, Solomon.
E. C. Bowman, Somerset.
W. O. Cooley & Son, South Haven.
Denton & Limbocker, South Mound.
Spring Hill Cooperative Ass'n, Spring Hill.
Craven Grain Co., Summerfield.
Thayer Grain Co., Thayer.
The Zellner Merc. Co., Tonganoxie.
D. O. Coe, Topeka.
Hal Baker, Toronto.
A. D. Jones, Troy.
Tyro Supply Co., Tyro.
Thos. Hatfield, Valley Falls.
F. W. Tannahill, Vernon.
J. E. Clark, Walnut.
Pat Diskin, Walnut.
E. J. Fischer, Wamego.
Farmers Grain Co., Wathena.
C. L. Foster, Waverly.
Star Grain & Lumber Co., Waverly.
W. M. Bowersock, Wayside.
Hamilton Merc. & Coal Co., Weir.
Ash & Foulke, Wellington.
M. C. Everett, Wellsville.
Farmers' Exc. & Supply Co., Westphalia.
Geo. Rebenstorf, Wetmore.
White City Grain Co., White City.
W. G. Higby, Whiting.
Central Seed Co., Wichita.
Sieben & Davis, Winchester.
C. L. Harter, Winfield.
Harder-Weide H. & Gr. Co., Yates Center.

*Dealers in Brands of Fertilizers Registered by Empire Carbon Works,
St. Louis, Mo.*

J. E. Lanbach, Columbus.
J. C. McKee, Columbus.

F. E. Maxwell, Columbus.
M. L. Westervelt, McCune.

*Dealers in Brands of Fertilizers Registered by Sulzberger & Sons
Company, Kansas City, Kan.*

W. D. Konantz, Arcadia.
E. B. Davis, Columbus.
J. C. Ebenstein, Columbus.

G. H. Barker, Girard.
Oswego Milling Co., Oswego.
F. E. Maxwell, Parsons.

ANALYSES OF INSPECTION SAMPLES.

In the accompanying tables a tabular presentation is made of the results of the analyses of inspection samples, together with the composition as guaranteed by the manufacturers. It will be seen that for the most part the composition is within the limits of tolerance provided by the law which permits a deficiency of not more than one-fifteenth of the guaranteed percentage without such deficiency being taken as evidence of fraudulent intent. Dealers, however, are liable to the user for damages resulting in consequence thereof. All cases of deficiency beyond this limit of tolerance have been taken up with the manufacturers, and it is believed that these are the result of accident and that it is the intention of the dealers to fully maintain the guaranteed composition.

COMPOSITION OF INSPECTION SAMPLES OF FERTILIZERS COMPARED WITH THE GUARANTIES OF MANUFACTURERS.

BRAND OF FERTILIZER.	Manufacturer.	Minimum percentage of total nitrogen.		Minimum percentage of phosphorus in phosphates.								Minimum percentage of potassium in compounds soluble in water.		Maximum percentage of chlorine in compounds soluble in water.	
		Found	Guaranteed	Soluble in water.		Reverted.		Insoluble.		Total.		Found	Guaranteed	Found	Guaranteed
				Found	Guaranteed	Found	Guaranteed	Found	Guaranteed	Found	Guaranteed				
63 Grain Grower	American Fertilizer and Reduction Co.	1.81	1.65	0.35	2.00	2.19	1.50	1.86	0.85	4.40	4.35	1.61	1.66	0.60	2.00
64 Kaw Special	do.	1.26	1.65	0.00	0.66	0.72	0.30	1.03	0.79	1.75	1.75	2.73	4.00	0.50	2.50
87 Kaw Wheat and Small Grain Grower	do.	1.55	1.65	Trace	2.00	1.84	1.50	1.64	0.85	3.48	4.35	2.40	1.66	0.90	2.00
88 Potato Grower	do.	0.96	.....	0.05	.....	1.38	.....	-0.79	.....	2.22	.....	4.96	.....	3.45	.....
89 Lawn and Garden	do.	1.99	.....	0.37	.....	1.24	.....	0.51	.....	2.12	.....	2.12	.....	0.65	.....
90 Kaw Trucker	do.	2.12	.....	0.18	.....	1.09	.....	0.62	.....	1.89	.....	1.59	.....	0.30	.....
91 Kaw Special	do.	1.21	1.65	0.05	0.66	0.73	0.30	0.86	0.79	1.64	1.75	2.49	4.00	0.55	2.50
92 Kaw Special	do.	1.40	1.65	0.00	0.66	1.42	0.30	0.81	0.79	2.23	1.75	2.53	4.00	0.52	2.50
93 Kaw Wheat and Small Grain Grower	do.	1.83	1.65	0.00	2.00	2.88	1.50	2.75	0.85	5.63	4.35	1.56	1.66	0.60	2.00
94 Kaw Wheat and Small Grain Grower	do.	1.63	1.65	0.14	2.00	2.00	1.50	1.82	0.85	3.96	4.35	2.11	1.66	0.75	2.00
95 Kaw Wheat and Small Grain Grower	do.	1.23	1.65	1.16	2.00	2.08	1.50	1.57	0.85	4.81	4.35	1.32	1.66	0.50	2.00
53 Fine Ground Beef Bone	Armour Packing Co.	2.62	2.47	.....	.....	3.97	2.62	6.46	7.86	10.43	10.48	.....	0.00	.....	0.00
56 Helmet Brand Lawn and Garden	do.	3.41	2.88	.....	.....	3.64	2.49	1.01	.....	4.65	3.49	3.41	3.32	0.25	1.51
65 Raw Bone Meal	do.	3.63	3.70	.....	.....	4.14	2.18	6.18	8.29	10.32	10.48	.....	0.00	0.60	0.00
66 Raw Bone Meal	do.	3.93	3.70	Trace	.....	4.78	2.18	5.27	8.29	10.05	10.48	.....	0.00	.....	0.00
67 Fine Ground Beef Bone	do.	2.91	2.47	.....	.....	5.59	2.62	4.50	7.86	10.09	10.48	.....	0.00	.....	0.00
53 Fine Ground Beef Bone	do.	2.62	2.47	.....	.....	3.97	2.62	6.46	7.86	10.43	10.48	.....	0.00	.....	0.00
65 Raw Bone Meal	do.	3.63	3.70	.....	.....	4.14	2.18	6.18	8.29	10.32	10.48	.....	0.00	.....	0.00
66 Raw Bone Meal	do.	3.93	3.70	Trace	.....	4.78	2.18	5.27	8.29	10.05	10.48	.....	0.00	.....	0.00
67 Fine Ground Beef Bone	do.	2.91	2.47	.....	.....	5.59	2.62	4.50	7.86	10.09	10.48	.....	0.00	.....	0.00
68 Raw Bone Meal	do.	3.56	3.70	.....	.....	4.38	2.18	5.42	8.29	9.80	10.48	.....	0.00	.....	0.00
71 Lawn and Garden	do.	3.73	2.88	1.43	.....	1.95	3.49	0.85	.....	4.23	3.49	3.56	3.32	0.50	0.00
72 Ammoniated Dissolved Bone and Potash	do.	1.77	1.64	3.31	.....	1.50	4.36	0.87	.....	5.68	4.36	2.08	1.66	2.95	1.65
73 Ammoniated Dissolved Bone and Potash	do.	2.10	1.64	2.67	.....	1.79	4.36	1.17	.....	5.53	4.36	1.74	1.66	1.40	1.65
74 Special Potato	do.	1.98	1.64	1.84	.....	1.80	3.49	1.01	.....	4.65	3.49	7.63	8.30	1.30	0.00
75 Lawn and Garden	do.	2.99	2.88	1.79	.....	1.92	3.49	1.06	.....	4.77	3.49	3.51	3.32	0.45	0.00
76 Helmet Brand 2-8-2	do.	1.76	1.64	0.95	.....	2.34	3.49	1.84	.....	5.13	3.49	1.75	1.66	2.35	1.65
77 Special Potato	do.	1.61	1.64	1.91	.....	1.39	3.49	0.35	.....	3.65	3.49	8.69	8.30	1.20	0.00
56 Helmet Brand Lawn and Garden	do.	3.41	2.88	.....	.....	3.64	3.49	1.01	.....	4.65	3.49	3.41	3.32	0.25	0.00

54	Swift's Special Grain	Swift & Co.	2.22	1.65	2.25	1.75	1.31	2.62	0.97	0.43	4.53	4.80	1.73	1.66	2.25	1.51
55	Pure Special Bone Meal	do.	2.50								10.43					
57	Swift's Superphosphate	do.	1.93	1.65	1.81	1.50	1.74	2.00	0.89	0.43	4.44	3.93	2.03	1.66	2.10	1.51
58	Special Grain	do.	2.00	1.65	1.75	1.75	1.88	2.62	1.59	0.43	5.22	4.80	1.74	1.66	1.80	1.51
59	Special Grain	do.	1.82	1.65	2.85	1.75	1.59	2.62	1.06	0.43	5.50	4.80	1.81	1.66	1.10	1.51
60	Pure Bone Meal	do.	3.04	2.47			5.22	4.92	5.40	5.56	10.62	10.48				
61	Pure Raw Bone Meal	do.	3.57	3.70							9.90	10.04				
62	Onion, Potato and Tobacco	do.	2.02	1.65	2.05	1.50	1.16	2.00	1.14	0.43	4.35	3.93	5.26	5.82		0.00
69	Pure Bone Meal	do.	2.83	2.47	Trace		5.02	4.92	4.95	5.56	9.97	10.48				
70	Pure Raw Bone Meal	do.	4.28	3.70			4.51		6.02		10.53	10.04				
78	Special Grain	do.	1.94	1.65	1.19	1.75	3.56	2.62	0.23	0.43	4.98	4.80	1.98	1.66	2.30	1.51
79	Special Grain	do.	1.95	1.65	2.37	1.75	2.31	2.62	0.36	0.43	5.04	4.80	1.89	1.66	2.05	1.51
80	Onion, Potato and Tobacco	do.	1.72	1.65	2.95	1.50	1.19	2.00	0.21	0.43	4.35	3.93	5.23	5.82	0.70	0.00
81	Vegetable Grower	do.	3.35	3.29	2.47	2.36	0.91	1.57	0.17	0.87	3.56	4.80	3.07	8.31	3.30	0.00
82	Onion, Potato and Tobacco	do.	1.96	1.65	2.23	1.50	1.50	2.00	0.21	0.43	3.94	3.93	5.13	5.82	6.32	0.00
83	Superphosphate	do.	1.70	1.65	2.42	1.50	1.24	2.00	0.05	0.43	3.71	3.93	1.83	1.66	2.60	1.51
84	Superphosphate	do.	1.61	1.65	2.24	1.50	1.19	2.00	0.11	0.43	3.54	3.93	1.82	1.66	2.50	1.51
85	Special Grain	do.	4.26	1.65	1.54	1.75	1.47	2.62	0.93	0.43	3.94	4.80	2.02	1.66	1.87	1.51
86	Special Grain	do.	1.85	1.65	2.47	1.75	1.62	2.62	0.37	0.43	4.46	4.80	1.86	1.66	2.40	1.51
96	Empire Bone Black Fertilizer	Empire Carbon Works	1.95	2.05	2.61		1.24	3.49	0.25	0.87	4.10	4.33	1.38	1.25	1.60	
97	Calumet Brand, Pure Bone Meal and Potash	Hirsh, Stein & Co.	1.37	0.80	0.03		6.84		2.66		9.53	8.73	3.15	3.32	8.70	
98	Enterprise Brand	Hull & Dillon	5.63	6.74	0.07	Trace	2.48	2.95	2.74	1.07	5.29	4.02	0.42	0.44	0.20	?

TRADE VALUE OF MATERIALS USED IN THE MANUFACTURE OF FERTILIZERS.

Commercial fertilizers are as a rule mixtures of various raw materials obtained from different parts of the country or the world, and a large element in the cost of a fertilizer is the cost of these raw materials. The directors and chemists of the eastern experiment stations adopt annually a schedule of trade values based upon published quotations of prices for these raw materials. The following schedule of trade values was adopted for use in the New England states for the year 1912. The data are taken from bulletin No. 254 of the New Jersey experiment station.

	Cents per pound.
Nitrogen in nitrates	16.5
Nitrogen in ammonium salts	16.5
Organic nitrogen in fine* ground fish meat and blood	22
Organic nitrogen in cottonseed meal and castor pomace	20
Organic nitrogen in fine* bone and tankage and in mixed fertilizers, 19	
Organic nitrogen in coarse* bone and tankage.....	15
Phosphorus in phosphates soluble in water	10.31
Phosphorus in phosphates soluble in ammonium citrate	9.16
Phosphorus in phosphates in fine* bone and tankage	9.16
Phosphorus in phosphates in cottonseed meal and castor pomace...	9.16
Phosphorus in phosphates in coarse* bone, tankage and ashes...	8.02
Phosphorus in phosphates insoluble in water and in ammonium citrate	4.58
Potassium in high-grade sulphate, and in forms free from muriate (chlorides)	6.32
Potassium in muriate	5.11
Potassium in cottonseed meal and castor pomace	6.02

From these trade values one may calculate the approximate market prices of the essential elements of fertilizers, but in comparing the result with the prices charged by dealers one must remember that this does not include freight nor the cost of grinding and mixing, bagging, and the numerous expenditures involved in the conduct of the business.

The cost of commercial fertilizers is so great that it is highly important that they be applied with intelligence and that only those elements which are necessary for the crop or in which the field is deficient be purchased. Undoubtedly a large saving

* "Fine" signifies such as will pass through a sieve with circular holes 1-50 of an inch in diameter, and "coarse" such as will not.

could be effected by following this simple principle. The element most likely to be necessary for Kansas farmers to purchase is phosphorus, as nitrogen can be added to the soil by means of leguminous crops. This bulletin will not go into the matter of the use of fertilizers at all, as copies are still available of bulletin No. 169, "Fertilizers and Their Use," and may be obtained on application to Director Wm. Jardine, Agricultural Experiment Station, Manhattan, Kan.