

September, 1915.

Inspection Circular No. 1

AGRICULTURAL EXPERIMENT STATION

KANSAS STATE AGRICULTURAL COLLEGE

CHEMISTRY DEPARTMENT

Analyses of Inspection Samples of Fertilizers.

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Herewith are presented the results of chemical analyses of inspection samples of commercial fertilizers on sale in Kansas. These samples were taken during the spring months of 1915.

The law tolerates a deficiency in the guarantee amounting to not more than one-fifteenth of the percentage guaranteed. In the table as published, samples which showed results inferior to the guarantee by more than this amount are indicated by boldface type. It will be seen that in general the results indicate conformity to the law. Those which do not are believed to be, in most cases, due to imperfect mixing rather than to intentional depression of the fertilizing value.

TABLE I. RESULTS OF ANALYSES OF

MANUFACTURERS AND BRANDS.	Seller.	Minimum percentage of total nitrogen.	
		Found.	Guaranteed.
ARMOUR PACKING CO.			
282 Armour's No. 1-12-1 Fertilizer.....	Pittsburg Modern Milling Co., Pittsburg.	.87	.82
285 Helmet Brand 16% Phosphate.....	Isham Hardware Co., Coffeyville.	.14	.....
244 Helmet Brand Ammoniated Dissolved Bone and Potash.	F. H. Porter, Columbus.....	1.91	1.65
245 Helmet Brand Ammoniated Dissolved Bone and Potash.	E. K. Gibbs, Hallowell.....	1.80	1.65
290 Helmet Brand Ammoniated Dissolved Bone and Potash.	Kelso Grain Co., Cherokee.....	1.88	1.65
291 Helmet Brand Ammoniated Dissolved Bone and Potash.	R. M. Gillman, Baxter.....	1.83	1.65
292 Helmet Brand Ammoniated Dissolved Bone and Potash.	Pittsburg Modern Milling Co., Pittsburg.	1.83	1.65
293 Helmet Brand Ammoniated Dissolved Bone and Potash.	Isham Hardware Co., Coffeyville.	1.95	1.65
211 Helmet Brand Fine Ground Beef Bone.	Pittsburg Modern Milling Co., Pittsburg.	2.69	2.47
216 Helmet Brand Fine Ground Beef Bone.	F. H. Porter, Columbus.....	2.98	2.47
219 Helmet Brand Fine Ground Beef Bone.	E. K. Gibbs, Hallowell.....	2.95	2.47
294 Helmet Brand Fine Ground Beef Bone.	Robinson Bros., Walnut.....	2.86	2.47
239 Helmet Brand Lawn and Garden Fer- tilizer.	W. S. Randle, Hutchinson.....	3.03	2.88
240 Helmet Brand Lawn and Garden Fer- tilizer.	Ross Bros. Seed House, Wichita..	2.53	2.88
273 Helmet Brand Lawn and Garden Fer- tilizer.	W. S. Randle, Hutchinson.....	2.74	2.88
274 Helmet Brand Lawn and Garden Fer- tilizer.	Ross Bros. Seed House, Wichita..	3.14	2.88
261 Helmet Brand No. 2-8-2 Fertilizer....	A. M. Smith, Girard.....	1.61	1.65
276 Helmet Brand No. 2-8-2 Fertilizer....	Pittsburg Modern Milling Co., Pittsburg.	1.77	1.65
277 Helmet Brand No. 2-8-2 Fertilizer....	Wickard Grain Co., Chanute.....	1.61	1.65
278 Helmet Brand No. 2-8-2 Fertilizer....	F. H. Porter, Columbus.....	1.48	1.65
279 Helmet Brand No. 2-8-2 Fertilizer....	J. N. Stewart, McCune.....	1.54	1.65
280 Helmet Brand No. 2-8-2 Fertilizer....	A. R. Quigg, Elk City.....	2.04	1.65
281 Helmet Brand No. 2-8-2 Fertilizer....	Isham Hardware Co., Coffeyville..	1.77	1.65
259 Helmet Phosphate and Potash.....	A. M. Smith, Girard.....	.....	.....
284 Helmet Phosphate and Potash.....	Griffith & Co., Paola.....	.....	.....
210 Helmet Brand Raw Bone Meal.....	F. H. Porter, Columbus.....	3.48	3.71
300 Helmet Brand Raw Bone Meal.....	R. M. Gillman, Baxter.....	3.58	3.71
EMPIRE CARBON WORKS.			
247 Empire Bone Black Fertilizer.....	H. L. Jaqueth, Galena.....	2.11	2.05
251 Empire Bone Black Fertilizer.....	A. M. Smith, Girard.....	2.01	2.05
252 Empire Bone Black Fertilizer.....	Oscar Johnson, Altamont.....	2.25	2.05
288 Empire Bone Black Fertilizer.....	F. M. Fleming, Crestline.....	2.23	2.05
242 Empire Crop Grower.....	Oscar Johnson, Altamont.....	1.81	1.65
254 Empire Crop Grower.....	J. E. Laubaugh, Columbus.....	1.77	1.65
266 Empire Crop Grower.....	T. B. Bumgarner, Neutral.....	1.78	1.65

INSPECTION SAMPLES OF FERTILIZERS.

Minimum percentage of phosphorus in phosphates.								Minimum percentage of potassium in compounds soluble in water.		Maximum percentage of chlorine in compounds soluble in water.	
Soluble in water.		Reverted.		Insoluble.		Total.		Found.	Guar-anteed.	Found.	Guar-anteed.
Found.	Guar-anteed.	Found.	Guar-anteed.	Found.	Guar-anteed.	Found.	Guar-anteed.				
3.03		1.66	5.24	.66	.22	5.35	5.46	1.02	.83	.80	
2.93		3.72	6.99	1.02	.22	7.67	7.21				
.68		3.51	4.87	1.15		5.34	4.87	1.53	1.66	1.85	1.65
1.01		2.77	4.37	1.04		4.82	4.37	1.73	1.66	1.85	1.65
1.07		2.94	4.37	1.15		5.16	4.37	1.64	1.66	1.80	1.65
2.26		1.23	4.37	1.17		4.66	4.37	1.64	1.66	1.60	1.65
1.55		1.83	4.37	1.26		4.64	4.37	1.63	1.66	1.70	1.65
1.46		2.46	4.37	.82		4.74	4.37	2.18	1.66	1.60	1.65
			2.62			7.86	10.65		None.		None.
			2.62			7.86	11.95		None.		None.
			2.62			7.86	11.00		None.		None.
			2.62			7.86	10.62		None.		None.
2.16		1.03	3.49	.75		3.94	3.49	3.86	3.32	4.30	None.
1.30		2.22	3.49	.64		4.16	3.49	3.77	3.32	3.70	None.
1.23		1.65	3.49	.98		3.86	3.49	3.15	3.32	3.40	None.
1.26		2.10	3.49	.78		4.14	3.49	3.78	3.32	4.40	None.
.52		2.66	3.49	.92		4.10	3.49	1.79	1.66	1.85	1.65
.77		2.49	3.49	1.33		3.59	3.49	1.66	1.66	1.70	1.65
2.10		1.30	3.49	1.10		4.50	3.49	1.68	1.66	1.90	1.65
1.47		.82	3.49	.85		3.14	3.49	1.44	1.66	1.20	1.65
1.01		2.20	3.49	.99		4.20	3.49	1.69	1.66	1.75	1.65
.74		2.29	3.49	1.05		4.08	3.49	1.89	1.66	1.90	1.65
.67		2.41	3.49	.78		3.86	3.49	1.64	1.66	2.00	1.65
.21		3.43		.91	.22	4.55		1.55	1.66	1.60	
.24		3.40		.78	.22	4.92		1.67	1.66	1.80	
			2.18			8.30	10.02		None.		None.
			2.18			8.30	9.40	10.48	None.		None.
2.32		1.26	3.49	.56	.87	4.14	4.36	1.22	1.25	1.30	
2.23		1.08	3.49	.62	.87	3.93	4.36	1.40	1.25	1.20	
1.99		1.40	3.49	.68	.87	4.07	4.36	1.31	1.25	1.40	
2.53		1.02	3.49	.62	.87	4.17	4.36	1.33	1.25	1.40	
2.24	2.50	1.38	1.00	.56	.50	4.18	4.00	1.64	1.66	1.80	2.00
2.16	2.50	1.32	1.00	.66	.50	4.14	4.00	1.73	1.66	1.80	2.00
2.45	2.50	1.69	1.00	.35	.50	4.49	4.00	1.64	1.66	1.60	2.00

TABLE I.--

MANUFACTURERS AND BRANDS.	Seller.	Minimum percentage of total nitrogen.	
		Found.	Guaranteed.
<i>EMPIRE CARBON WORKS--concluded.</i>			
212 Empire Pure Raw Bone Meal.....	T. B. Bumgarner, Neutral.....	3.80	3.29
221 Empire Pure Raw Bone Meal.....	Oscar Johnson, Altamont.....	3.98	3.29
225 Empire Special Bone Meal.....	G. P. Bumgarner, Neutral.....	2.12	1.23
<i>HULL & DILLON.</i>			
255 Enterprise Brand.....	Hull & Dillon, Pittsburg.....	6.89	6.74
<i>SULZBERGER & SONS COMPANY.</i>			
213 Sulzberger's Pure Bone Meal.....	J. C. Ebenstein, Columbus.....	2.44	2.47
222 Sulzberger's Pure Bone Meal.....	H. L. Jaqueth, Columbus.....	2.71	2.47
214 Sulzberger's Pure Raw Bone Meal...	J. C. Ebenstein, Columbus.....	4.10	3.75
224 Sulzberger's Pure Raw Bone Meal...	H. L. Jaqueth, Columbus.....	3.76	3.75
249 "S & S" Raw Bone Meal and Plant Potash.....	J. C. Ebenstein, Columbus.....	1.74	1.65
250 "S & S" Raw Bone Meal and Plant Potash.....	Farmers' Union, Girard.....	1.68	1.65
220 "S & S" Special Bone Meal.....	J. C. Ebenstein, Columbus.....	2.01	1.23
<i>SWIFT & COMPANY.</i>			
241 Swift's Champion Wheat and Corn Grower.....	Libby Hardware Co., Altamont..	1.64	1.75
268 Swift's Diamond "M" Grain Grower..	Pittsburg Elevator Co., Pittsburg.	1.61	1.70
267 Swift's Diamond "M" Grain Grower..	Olsen Bros., Edna.....	1.77	1.70
269 Swift's Diamond "M" Grain Grower..	Wagstaff Mercantile Co., Wagstaff.	1.64	1.70
270 Swift's Diamond "M" Grain Grower..	Everett George, Earleton.....	1.45	1.70
275 Swift's Hay and Silage Grower.....	Olsen Bros., Edna.....	2.00	2.51
235 Swift's Onion, Potato and Tobacco Fertilizer.	Young & Son, Hutchinson.....	1.66	1.65
236 Swift's Onion, Potato and Tobacco Fertilizer.	Belle Plaine Hardware & Implementation Co., Belle Plaine.	1.67	1.65
237 Swift's Onion, Potato and Tobacco Fertilizer.	W. L. Powell, Arkansas City....	1.68	1.65
238 Swift's Onion, Potato and Tobacco Fertilizer.	D. A. Coe, Topeka.....	1.70	1.65
257 Swift's Onion, Potato and Tobacco Fertilizer.	Marlow Seed Co., Wichita.....	1.66	1.65
271 Swift's Onion, Potato and Tobacco Fertilizer.	Everett George, Earleton.....	1.52	1.65
272 Swift's Onion, Potato and Tobacco Fertilizer.	E. B. Davis, Columbus.....	1.53	1.65
217 Swift's Pure Bone Meal.....	Oswego Milling Co., Oswego.....	2.21	2.47
226 Swift's Pure Bone Meal.....	Young & Son, Hutchinson.....	2.39	2.47
227 Swift's Pure Bone Meal.....	E. B. Davis, Columbus.....	2.60	2.47
246 Swift's Pure Bone Meal.....	Libby Hardware Co., Altamont..	.....	2.47
295 Swift's Pure Bone Meal.....	St. Elmo Porter, Columbus.....	2.64	2.47
296 Swift's Pure Bone Meal.....	E. B. Davis, Columbus.....	1.97	2.47
297 Swift's Pure Bone Meal.....	Truitt's Greenhouse, Chanute....	2.49	2.47
298 Swift's Pure Bone Meal.....	Wagstaff Mercantile Co., Wagstaff.	2.13	2.47
299 Swift's Pure Bone Meal.....	Olsen Bros., Edna.....	2.27	2.47

CONTINUED.

Minimum percentage of phosphorus in phosphates.								Minimum percentage of potassium in compounds soluble in water.		Maximum percentage of chlorine in compounds soluble in water.	
Soluble in water.		Reverted.		Insoluble.		Total.		Found.	Guaranteed.	Found.	Guaranteed.
Found.	Guaranteed.	Found.	Guaranteed.	Found.	Guaranteed.	Found.	Guaranteed.	Found.	Guaranteed.	Found.	Guaranteed.
						8.67	8.73				
						8.67	8.73				
						8.17	10.01				
None.			2.95		1.07	3.32	4.02	.37	.44	.40	
			5.00		5.85		10.85				
			5.00		5.85	11.90	10.85				None.
			2.20		7.80	10.80	10.00				None.
			2.20		7.80	11.10	10.00				None.
None.		.89		6.95		7.84	6.12	1.18	1.66	1.10	
None.		1.28		6.12		7.40	6.12	1.22	1.66	1.20	
						12.51	12.23				
3.18	4.02	1.92	1.28	.76	.26	5.86	5.56	1.64	1.70	1.80	1.88
3.29	3.52	1.21	1.33	.33	.18	4.83	5.04	.92	.82	.80	1.56
2.93	3.52	1.47	1.33	.42	.18	4.82	5.04	1.04	.82	1.20	1.56
3.82	3.52	1.40	1.33	.34	.18	5.56	5.04	.81	.82	1.00	1.56
3.35	3.52	1.43	1.33	.32	.18	5.10	5.04	.73	.82	1.00	1.56
2.22	2.29	1.06	1.22	.37	.16	3.65	3.67			.40	.56
2.31	1.50	1.04	2.00	.32	.43	3.66	3.93	5.32	5.82	2.00	
2.60	1.50	1.08	2.00	.42	.48	4.10	3.93	5.69	5.82	2.20	
2.73	1.50	1.17	2.00	.44	.43	4.34	3.93	5.96	5.82	2.20	
2.16	1.50	1.08	2.00	.64	.43	3.88	3.93	5.21	5.82	.70	
2.35	1.50	.85	2.00	.35	.43	3.55	3.93	5.44	5.82	2.40	
1.86	1.50	1.32	2.00	.56	.43	3.74	3.93	5.31	5.82	5.80	
1.85	1.50	1.31	2.00	.61	.43	3.77	3.93	5.04	5.82	5.20	
						11.40	10.48				
						11.25	10.48				
						10.85	10.48				
						11.15	10.48				
						10.35	10.48				
						10.90	10.48				
						10.75	10.48				
						11.27	10.48				
						10.35	10.48				

TABLE I—

MANUFACTURERS AND BRANDS.	Seller.	Minimum percentage of total nitrogen.	
		Found.	Guaranteed.
<i>SWIFT & COMPANY—Concluded.</i>			
209 Swift's Pure Raw Bone Meal	Marlow Bros., Wichita	4.12	3.75
215 Swift's Pure Raw Bone Meal	Pittsburg Elevator Co., Pittsburg ..	4.05	3.75
218 Swift's Pure Raw Bone Meal	Libby Hardware Co., Altamont ..	4.01	3.75
223 Swift's Pure Raw Bone Meal	Oswego Milling Co., Oswego	3.91	3.75
228 Swift's Pure Raw Bone Meal	E. B. Davis, Columbus	4.01	3.75
243 Swift's Special Bone Meal and Potash ..	Oswego Milling Co., Oswego .....	.74	.82
248 Swift's Special Bone Meal and Potash ..	E. B. Davis, Columbus .....	.72	.82
253 Swift's Special Bone Meal and Potash ..	G. H. Barker, Girard .....	.77	.82
229 Swift's Special Grain Fertilizer	Young & Son, Hutchinson	1.70	1.65
230 Swift's Special Grain Fertilizer	Pittsburg Elevator Co., Pittsburg ..	1.84	1.65
231 Swift's Special Grain Fertilizer	Libby Hardware Co., Altamont ..	1.61	1.65
232 Swift's Special Grain Fertilizer	E. B. Davis, Columbus	1.68	1.65
258 Swift's Special Grain Fertilizer	Marlow Seed Co., Wichita	1.70	1.65
262 Swift's Special Grain Fertilizer	E. B. Davis, Columbus	1.77	1.65
263 Swift's Special Grain Fertilizer	St. Elmo Porter, Columbus	1.54	1.65
264 Swift's Special Grain Fertilizer	Everett George, Earlton	1.68	1.65
265 Swift's Special Grain Fertilizer	I. E. Clark, Walnut	1.61	1.65
260 Swift's Special Orchard Fertilizer	Marlow Seed Co., Wichita	1.80	.....
233 Swift's Superphosphate	Young & Son, Hutchinson	1.59	1.65
234 Swift's Superphosphate	W. L. Powell, Arkansas City	1.36	1.65
256 Swift's Superphosphate	Marlow Seed Co., Wichita	1.35	1.65

—CONCLUDED.

Minimum percentage of phosphorus in phosphates.								Minimum percentage of potassium in compounds soluble in water.		Maximum percentage of chlorine in compounds soluble in water.	
Soluble in water.		Reverted.		Insoluble.		Total.		Found.	Guaranteed.	Found.	Guaranteed.
Found.	Guaranteed.	Found.	Guaranteed.	Found.	Guaranteed.	Found.	Guaranteed.	Found.	Guaranteed.	Found.	Guaranteed.
						10.15	10.04				
						10.25	10.04				
						10.20	10.04				
						10.85	10.04				
						10.32	10.04				
							7.85	3.52	3.32	.78	3.02
None.		1.55		6.41		7.96	7.85	3.44	3.32	6.40	3.02
None.		1.68		6.04		7.72	7.85	3.60	3.32	6.35	3.02
2.58	1.75	1.64	2.62	.66	.43	4.88	4.80	1.57	1.66	1.20	1.51
2.77	1.75	1.37	2.62	.60	.43	4.74	4.80	1.66	1.66	1.40	1.51
1.44	1.75	3.00	2.62	.74	.43	5.18	4.80	1.77	1.66	1.80	1.51
2.80	1.75	1.60	2.62	.95	.43	5.35	4.80	1.62	1.66	1.40	1.51
3.22	1.75	1.46	2.62	.48	.43	5.16	4.80	2.15	1.66	2.00	1.51
2.45	1.75	1.46	2.62	.60	.43	4.51	4.80	1.64	1.66	1.70	1.51
1.29	1.75	2.64	2.62	.72	.43	4.65	4.80	1.60	1.66	1.70	1.51
2.44	1.75	1.48	2.62	.49	.43	4.42	4.80	1.41	1.66	1.60	1.51
3.08	1.75	1.23	2.62	.47	.43	4.78	4.80	1.66	1.66	1.60	1.51
3.99		1.23		.58		5.85		6.73		7.75	
.76	1.50	2.90	2.00	1.32	.43	4.98	3.93	1.34	1.66	1.60	1.51
1.91	1.50	.89	2.00	.44	.43	3.24	3.93	1.43	1.66	1.20	1.51
1.86	1.50	1.03	2.00	.49	.43	3.43	3.93	1.72	1.66	1.40	1.51