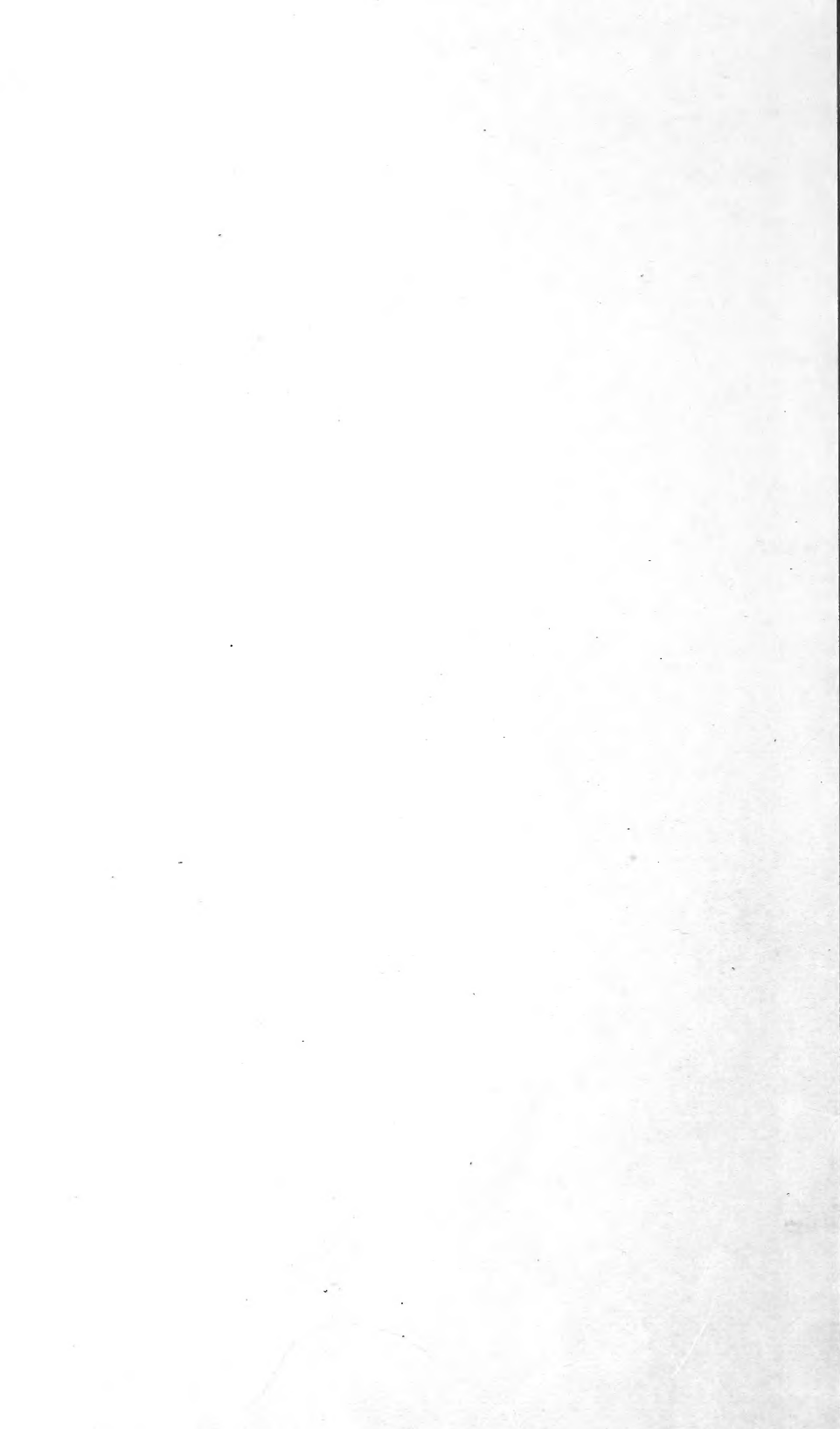


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UNITED STATES DEPARTMENT OF AGRICULTURE



DEPARTMENT BULLETIN No. 1199



Washington, D. C.

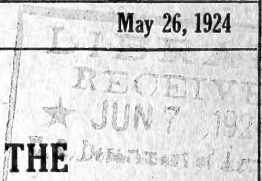
May 26, 1924

LIST OF BULLETINS OF THE  
AGRICULTURAL EXPERIMENT STATIONS IN  
THE UNITED STATES FROM THEIR  
ESTABLISHMENT TO THE  
END OF 1920

PREPARED IN THE OFFICE OF EXPERIMENT STATIONS

WASHINGTON  
GOVERNMENT PRINTING OFFICE

1924



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- ALABAMA.—*Auburn*, M. J. Funchess, <sup>1</sup> Director.  
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<sup>1</sup> Acting director.

# UNITED STATES DEPARTMENT OF AGRICULTURE



DEPARTMENT BULLETIN No. 1199



Washington, D. C.

May 26, 1924

## BULLETINS OF THE EXPERIMENT STATIONS.

This bulletin lists approximately 12,500 of the 17,500 or more publications of the State experiment stations (including those of Alaska and the insular possessions) from 1875 to 1920, inclusive. It is confined primarily to the regular bulletin series of the stations. It does not include circulars and other more or less ephemeral publications; annual reports, except such as are numbered as bulletins; nor scientific contributions from the stations which have appeared in the *Journal of Agricultural Research* or other scientific periodicals.

The work of preparing the list has been done at intervals of several years and by a number of different persons, but mainly by Miss E. Lucy Ogden, former librarian of the States Relations Service, and Miss Martha L. Gericke, present librarian of the Office of Experiment Stations.

### ALABAMA.

Agricultural Experiment Station of the Alabama Polytechnic Institute, Auburn.

#### BULLETINS (FIRST SERIES), 1833-1885.

1. [Announcement of lines of work to be undertaken by the station.] German carp. By J. S. Newman.—Experiments in wheat. By W. C. Stubbs. 1883.
2. Economy in fertilization. By J. S. Newman.—[Commercial fertilizers.] By W. C. Stubbs.—Synopsis of meteorological record [1881-83]. By P. H. Mell. 1884.
3. Catalogue of fruits. By J. S. Newman.—Inquiry and answer department.—German carp.—Experiments with corn and ensilage. By W. C. Stubbs. 1884. Also included in a circular of the Commissioner of Agriculture.
4. Experiments in cotton. By W. C. Stubbs.—Answers to inquiries.—Agricultural camp meetings. By J. S. Newman. 1884. Published as a bulletin of the Alabama State Department of Agriculture.
5. Report on the phosphates of Alabama. By W. C. Stubbs [E. A. Smith and W. L. Broun, jr.]—Agricultural and economic value of these phosphatic deposits. 1884. Published as a bulletin of the State Department of Agriculture.
6. [Commercial fertilizers. By W. C. Stubbs].—Experiments [with fertilizers] conducted by J. C. Nicholson. 1884. Published as a bulletin of the Alabama State Department of Agriculture.
7. [Commercial fertilizers: experiments, analyses, etc.] By J. S. Newman. 1885. Published as a bulletin of the Alabama State Department of Agriculture.
8. "The boll worm" (*Heliothis armigera* Huebner) and "The cotton worm" (*Aletia argillacea* Huebner, *Aletia rylina* Say). Mar., 1885. Published as a bulletin of the Alabama State Department of Agriculture.
9. Commercial fertilizers; marls and phosphate; mucks. By W. C. Stubbs. 1885. Published as a bulletin of the Alabama State Department of Agriculture.
10. Nitrogenous manures. By W. C. Stubbs. Aug., 1885. Published as a bulletin of the Alabama State Department of Agriculture.

#### BULLETINS (SECOND SERIES), 1885-1887.

1. The grape. By J. E. Saunders. Sept., 1885. Published as a bulletin of the Alabama State Department of Agriculture.
2. Fertilization. By E. C. Betts and W. H. Jordan.—The cotton plant and its products. By Prof. White. [1885?] Published as a bulletin of the Alabama State Department of Agriculture.
3. Fertilizers. By N. T. Lupton. Dec. 16, 1885. Published as a bulletin of the Alabama State Department of Agriculture.
4. Gardening. By E. C. Betts. Dec., 1886. Published as a bulletin of the Alabama State Department of Agriculture.
5. Experiments for clubs. By J. S. Newman. Jan., 1886. Published as a bulletin of the Alabama State Department of Agriculture.

6. Experiments in cotton culture, 1884 and 1885. By J. S. Newman. Feb., 1886. Published as a bulletin of the Alabama State Department of Agriculture.
7. Improvement of soils, etc. By N. T. Lupton. Mar., 1886. Published as a bulletin of the Alabama State Department of Agriculture.
8. Guaranteed analyses of commercial fertilizers, season 1886-87. By E. C. Betts. Jan. 18, 1887.
9. [Miscellaneous analyses.] By N. T. Lupton. Feb., 1887. Published as a bulletin of the Alabama State Department of Agriculture.

## BULLETINS FOR 1887.

1. Report of experiments with oats; report from the Canebrake Experiment Station. By J. S. Newman. Jan. 6, 1887.
2. [Experiments with vegetables and strawberries.] By J. S. Newman. Feb. 11, 1887.
3. Experiments with corn [at Auburn and Canebrake stations] 1886. By J. S. Newman. Mar. 3, 1886 [i. e. 1887].
4. Experiments with cotton [at Auburn and Canebrake stations] 1886. By J. S. Newman. Apr. 15, 1887.
5. Experiments with sweet potatoes and sugar cane, 1876 [i. e. 1886]. By J. S. Newman. July 15, 1887.
6. Experiments with oats [at Canebrake and Auburn stations]. By J. S. Newman. Sept., 1887.
7. Experiments with corn conducted on the Canebrake Experiment Station, 1887. By J. S. Newman. Oct., 1887.
8. Analyses of fertilizers for season of 1887-88. By R. F. Kolb. Dec. 5, 1887. Published as a bulletin of the Alabama State Department of Agriculture.

## BULLETINS FOR 1888.

1. Experiments with corn. By J. S. Newman. Jan. 6, 1888.
2. Small fruits, vegetables, etc. By J. S. Newman. Jan. 25, 1888.
3. Cotton experiments at the Canebrake station. By J. S. Newman. Feb., 1888.
4. [Experiments with fertilizers for cotton; relation of different parts of the hog to the whole dressed weight.] Apr., 1888.
5. Effect of fertilizers upon sweet potatoes. June 26, 1888.

## BULLETINS (NEW SERIES).

After being dropped and resumed from time to time, the designation of "new series" was finally abandoned beginning with No. 27.

1. Report of Agricultural Experiment Station, Agricultural and Mechanical College, Auburn, Ala. July, 1888.
2. Report of Agricultural Experiment Station, Agricultural and Mechanical College, Auburn, Ala. Oct., 1888.
3. Report of Agricultural Experiment Station, Agricultural and Mechanical College, Auburn, Ala. Jan., 1889. Subjects: Report of experiments with corn, sweet potatoes, ground peas, turnips, and grapes; analyses of fertilizers, soils, etc.; weeds of Alabama (cont.); meteorology.
4. Strawberry culture; grape culture and pruning; raspberry culture. By J. S. Newman. Feb., 1889.
5. Cotton; pigs. By J. S. Newman.—[Turnips, keeping qualities of varieties.]—Cattle. By Isaac Ross.—Analyses. By N. T. Lupton.—Meteorology. By P. H. Mell and T. B. Samford. April, 1889.
6. Grasses of Alabama and their cultivation. By P. H. Mell. July, 1889.
7. Experiments with methods of setting and churning milk. By Isaac Ross.—An experiment in setting milk. By J. W. Hart.—Report of experiments with varieties of vegetables. By James Clayton.—Department of meteorology. By P. H. Mell.—Directions for sending specimens of diseased plants, etc., to the experiment station. By G. F. Atkinson. Oct., 1889.
8. Commercial fertilizers. By N. T. Lupton. Nov., 1889.
9. Nematode root galls. A preliminary report on the life history and metamorphosis of a root gall nematode *Heterodera radiclea* (Greiff) Müll. and the injuries produced by it on the roots of various plants. By G. F. Atkinson. Dec., 1889.
10. Grape culture. By J. S. Newman. Jan., 1890. Not to be confused with Bul. 10 of the Alabama State Department of Agriculture, July, 1896, the cover of which bears also the name of the Agricultural Experiment Station.
11. Peaches and plums. By J. S. Newman. Feb., 1890.
12. Cooperative soil tests, 1889. By J. S. Newman. Feb., 1890.
13. Microscopic study of certain varieties of cotton. By P. H. Mell. Mar., 1890.
14. Pea vines as a fertilizer [commercial fertilizers]. By N. T. Lupton. Apr., 1890.
15. Insecticides: Kerosene emulsion, how to make and apply it. By G. F. Atkinson. Apr., 1890.
16. Corn, cotton, rye, chufas; conclusions from 6 years of experiments [with fertilizers]. By J. S. Newman. June, 1890.
17. Dry application of Paris green and London purple for the cotton worm. By G. F. Atkinson.—Report of the Alabama weather service. By P. H. Mell. July, 1890.
18. Climatology of Alabama. By P. H. Mell. Aug., 1890.
19. Roads and road making. By J. H. Lane.—Meteorology. By P. H. Mell. Oct., 1890.
20. Small fruits, melons, and vegetables. By J. S. Newman and James Clayton.—Report of the weather service. By P. H. Mell.—[Table of soil temperatures. By A. M. Lloyd.] Nov., 1890.
21. A new root rot disease of cotton. By G. F. Atkinson.—Report of the weather service. By P. H. Mell.—[Table of soil temperatures. By A. M. Lloyd.] Dec., 1890.
22. Experiments with cotton. By J. S. Newman and James Clayton.—Report of Alabama weather service. By P. H. Mell.—[Table of soil temperatures. By A. M. Lloyd.] Jan., 1891.
23. Cooperative soil tests of fertilizers. By J. S. Newman.—Report of Alabama weather service. By P. H. Mell.—[Table of soil temperatures. By A. M. Lloyd.] Feb., 1891.
24. [i. e. 24.] Dairying and breeding. By Isaac Ross.—Report of Alabama weather service. By P. H. Mell.—[Table of soil temperatures. By A. M. Lloyd.] Feb. [i. e. Mar.], 1891.
25. Effects on butter by feeding cottonseed and cottonseed meal. By N. T. Lupton. Apr., 1891.
26. Commercial fertilizers. By N. T. Lupton. Apr., 1891.
27. Black "rust" of cotton. By G. F. Atkinson. May, 1891.
28. Watermelons and cantaloupes. By J. S. Newman and James Clayton. Nov., 1891.
29. Grapes, raspberries, and strawberries. By J. S. Newman and James Clayton. Nov., 1891.
30. Apples, pears, peaches, and plums. By J. S. Newman. Nov., 1891.
31. Irish and sweet potatoes. By J. S. Newman and James Clayton. Nov., 1891.
32. Corn, wheat, and oats. By J. S. Newman and James Clayton. Nov., 1891.
33. Cotton. By J. S. Newman and James Clayton. Dec., 1891.
34. Cooperative soil-test experiments for 1891. Jan., 1892.

35. Glanders. By C. A. Cary. Jan., 1892.
36. Some leaf blights of cotton. By G. F. Atkinson. Mar., 1892.
37. Tobacco. By A. J. Bondurant. Mar., 1892.
38. Fertilizers. By N. T. Lupton. July, 1892.
39. Wheat. By A. J. Bondurant and James Clayton. Nov., 1892.
40. Cotton experiments. By A. J. Bondurant and James Clayton. Jan., 1893.
41. Some diseases of cotton. By G. F. Atkinson. Dec., 1892.
42. Cooperative soil-test experiments for 1892. By A. J. Bondurant and James Clayton. Jan., 1893.
43. Eye diseases of domestic animals. By C. A. Cary. May, 1893.
44. Tobacco plant. By A. J. Bondurant. May, 1893.
45. Injurious and beneficial insects: Some insect pests of the farm and garden. By J. M. Stedman. June, 1893.
46. Rye vs. ensilage: The effect of rye and ensilage on the yield of milk. By A. J. Bondurant and A. F. Cory. June, 1893.
47. Fruits. By A. J. Bondurant and James Clayton. July, 1893.
48. The effect of decomposing organic matter on natural phosphates; commercial fertilizers. By N. T. Lupton. July, 1893. Issued by the Alabama State Department of Agriculture.
49. Varieties of wheats and grasses. By A. J. Bondurant and James Clayton. Oct., 1893.
50. Fruit-tree blight in general. By J. M. Stedman. Nov., 1893.
51. Vegetables. By A. J. Bondurant and James Clayton. Oct., 1893.
52. Corn and cotton. By A. J. Bondurant. Jan., 1894.
53. A new milk or water sterilizer. By C. A. Cary. Jan., 1894.
54. Tobacco. By A. J. Bondurant. Feb., 1894.
55. A new disease of cotton: Cotton boll rot. By J. M. Stedman. Apr., 1894.
56. Experiments in crossing for the purpose of improving the cotton fiber. By P. H. Mell. May, 1894.
57. Fertilizers required by cotton as determined by the analysis of the plant. By J. T. Anderson. May, 1894.
57. Fertilizers. By B. B. Ross. July, 1894. Issued by the Alabama State Department of Agriculture.
58. Paris green: Composition and adulterations. By B. B. Ross. Aug., 1894.
59. Cooperative soil tests of corn. By A. J. Bondurant. Jan., 1895.
60. Experiments on foreign seeds. By P. H. Mell. Jan., 1895.
61. Insects injurious to stored grain. By J. M. Stedman. Jan., 1895.
62. Corn and cotton. By A. J. Bondurant. Feb., 1895.
63. Fertilizers, commercial and domestic. By B. B. Ross. Feb., 1895.
64. Tobacco. By A. J. Bondurant. Feb., 1895.
65. Cooperative seed tests. By A. J. Bondurant. June, 1895.
66. Cane sirup. By B. B. Ross. Oct., 1895.
67. Bovine tuberculosis. By C. A. Cary. Nov., 1895.
68. Pig feeding experiments. By C. A. Cary. Jan., 1896.
69. Treatment of some fungous diseases. By L. M. Underwood and F. S. Earle. Feb., 1896.
70. The flora of Alabama, Part V, Leguminosae and Rosaceae. By P. H. Mell. Mar., 1896.
71. Experiments with foreign cotton. By P. H. Mell. Apr., 1896.
72. A study of skin tumors of horses and mules in Alabama. By S. L. Coleman. July, 1896.
73. Edible fungi, a wasted food product. By L. M. Underwood. Oct., 1896.
74. Flour considered from the standpoint of nutrition. By L. M. Underwood. Oct., 1896.
75. Experiments with corn, 1896. By J. F. Duggar. Dec., 1896.
76. Experiments with cotton. By J. F. Duggar. Jan., 1897.
77. The San José scale—a warning to the fruit growers of Alabama; some other insect pests; the tomato worm; grape-leaf-hoppers; cabbage worms. By C. F. Baker. Jan., 1897.
78. Cooperative fertilizer experiments with cotton in 1896. By J. F. Duggar. Feb., 1897.
79. Some horticultural suggestions. By F. S. Earle. Mar., 1897.
80. A preliminary list of Alabama fungi. By L. M. Underwood and F. S. Earle. Apr., 1897.
81. Meat inspection. By C. A. Cary. May, 1897.
82. Corn, cowpeas, and wheat bran for fattening pigs. By J. F. Duggar. May, 1897.
83. Hybrids from American and foreign cotton. By P. H. Mell. June, 1897.
84. Turnips. By F. S. Earle. Aug., 1897.
85. Japanese plums. By F. S. Earle. Aug., 1897.
86. More about the San José scale; a sweet-potato pest; regarding carbon bisulphid, insecticides and pumps in general. By C. F. Baker. Aug., 1897.
87. Soil inoculation for leguminous plants. By J. F. Duggar. Aug., 1897.
88. Experiments with corn. By J. F. Duggar. Dec., 1897.
89. Experiments with cotton. By J. F. Duggar. Jan., 1898.
90. The peach tree borer; the fruit bark beetle. By C. F. Baker. Jan., 1898.
91. Cooperative fertilizer experiments with cotton in 1897. By J. F. Duggar. Feb., 1898.
92. Experiments with lime on acid soils. By F. S. Earle and A. W. Orr. Apr., 1898.
93. Peanuts, cowpeas, and sweet potatoes as food for pigs. By J. F. Duggar. Apr., 1898.
94. Strawberries. By F. S. Earle. Nov., 1898.
95. Experiments with oats. By J. F. Duggar. Aug., 1898.
96. Experiments with crimson clover and hairy vetch. By J. F. Duggar. Aug., 1898.
97. Dairy and milk inspection. By C. A. Cary. Sept., 1898.
98. Orchard notes. By F. S. Earle. Nov., 1898.
99. Cotton rust. By F. S. Earle. Dec., 1898.
100. Lawns, pastures, and hay. By P. H. Mell. Dec., 1898.
101. Experiments with cotton, 1898. By J. F. Duggar. Jan., 1899.
102. Cooperative fertilizer experiments with cotton, 1898. By J. F. Duggar. Feb., 1899.
103. Experiments in syrup making. By B. B. Ross. Mar., 1899.
104. Velvet beans. By J. F. Duggar. Apr., 1899.
105. Winter pasturage, hay, and fertility afforded by hairy vetch. By J. F. Duggar. Aug., 1899.
106. Orchard notes. By F. S. Earle. Nov., 1899.
107. Results of experiments on cotton in Alabama. Introduction. P. H. Mell.—Varieties of cotton; preparation and cultivation of the soil for cotton; the manuring of cotton. By J. F. Duggar.—The diseases of cotton. By F. S. Earle.—Climatic conditions of the cotton belt (condensed from U. S. Dept. Agr., Weather Bur. Bul. 8); the improvement of the cotton by hybridization and selection. By P. H. Mell.—The cotton plant considered in some of its chemical relations. By B. B. Ross [and others]. Dec., 1899.
108. Tomatoes. By F. S. Earle. Apr., 1900.
109. Strawberries. By F. S. Earle. July, 1900.
110. Grapes. By F. S. Earle and C. F. Austin. Dec., 1900.
111. Corn culture. By J. F. Duggar. Dec., 1900.
112. Orchard notes. By F. S. Earle. Dec., 1900.

113. Cooperative experiments with cotton in 1899-1900. By J. F. Duggar. Feb., 1901.
114. Feeding experiments with dairy cows. By J. F. Duggar and R. W. Clark. May, 1901.
115. Commercial fertilizers. By J. T. Anderson. Aug., 1901.
116. Texas, or acclimation fever. By C. A. Cary. Sept., 1901.
117. Orchard notes. By C. F. Austin. Dec., 1901.
118. Cowpea culture. By J. F. Duggar. Jan., 1902.
119. The flora of the metamorphic region of Alabama. By F. S. Earle. Apr., 1902.
120. The cowpea and the velvet bean as fertilizers. By J. F. Duggar. Apr., 1902.
121. Dairy herd record and creamery notes. By R. W. Clark. Nov., 1902.
122. Grazing and feeding experiments with pigs. By J. F. Duggar. Jan., 1903.
123. Vetch, cowpea, and soybean hay as substitutes for wheat bran. By J. F. Duggar. Apr., 1903.
124. The horticultural law; notes on some of the insects and fungous diseases affecting horticultural crops. By R. S. Mackintosh. May, 1903.
125. Some diseases of cattle. By C. A. Cary and F. G. Matthews. June, 1903.
126. A leaf-curl disease of oaks. By E. M. Wilcox. Oct., 1903.
127. Alfalfa in Alabama. By J. F. Duggar. Feb., 1904.
128. Feeding and grazing experiments with beef cattle. By J. F. Duggar [R. W. Clark and J. M. Jones]. June, 1904.
129. The Mexican cotton boll-weevil. By E. M. Wilcox. Aug., 1904.
130. Tests of varieties of cotton in 1904. By J. F. Duggar. Jan., 1905.
131. Cooperative fertilizer experiments with cotton in 1901, 1902, 1903, and 1904. By J. F. Duggar. Feb., 1905.
132. Diseases of the apple, cherry, peach, pear, and plum with methods of treatment. By E. M. Wilcox. Apr., 1905.
133. Manufacture of cane sirup. By B. B. Ross. Dec., 1905.
134. Corn culture. By J. F. Duggar. Dec., 1905.
135. Diseases of sweet potatoes in Alabama, a preliminary report. By E. M. Wilcox. June, 1906.
136. Chicken pox or sorehead in poultry. By C. A. Cary. Aug., 1906.
137. Experiments with oats. By J. F. Duggar. Sept., 1906.
138. Variety tests with cotton and corn; Williamson method of corn culture. By J. F. Duggar and L. N. Duncan. Dec., 1906.
139. Injurious insects and their control. By W. T. Clarke. Apr., 1907.
140. Descriptions and classifications of varieties of American upland cotton. By J. F. Duggar. July, 1907.
141. Texas or tick fever. By C. A. Cary. July, 1907.
142. Corn breeding in Alabama. By E. M. Wilcox. Mar., 1908.
143. Feeds supplementary to corn for southern pork production. By D. T. Gray, J. F. Duggar, and J. W. Ridgway. July, 1908.
144. The San José scale and lime-sulfur wash. By W. E. Hinds. Feb., 1909.
145. Local fertilizer experiments with cotton in 1905, 1906, 1907, and 1908. By J. F. Duggar. Feb., 1909.
146. Facing the boll-weevil problem in Alabama. By W. E. Hinds. June, 1909.
147. Crimson clover. By J. F. Duggar. Aug., 1909.
148. Raising lambs in Alabama; Maintenance rations for ewes; feeding cottonseed meal to pregnant ewes. By D. T. Gray and J. W. Ridgway. Oct., 1909.
149. Tests of varieties of cotton in 1909. By J. F. Duggar and E. F. Cauthen. Feb., 1910.
150. Raising beef cattle in Alabama. By D. T. Gray and W. F. Ward. June, 1910.
151. Wintering steers in Alabama; Fattening cattle on pasture in Alabama. By D. T. Gray and W. F. Ward. June, 1910.
152. Self-boiled lime sulphur and its use. By P. F. Williams and J. C. C. Price. Feb., 1911.
153. Experiments with cotton: Varieties, boll rot, wilt, phosphates. By J. F. Duggar and E. F. Cauthen. Feb., 1911.
154. Corn, soy-bean pastures, tankage, and cottonseed meal for fattening hogs. By D. T. Gray, J. W. Ridgway, and E. R. Eudaly. Feb., 1911.
155. The pecan in Alabama. By P. F. Williams. Mar., 1911.
156. Peach growing in Alabama. By P. F. Williams and J. C. C. Price. Sept., 1911.
157. The Satsuma orange. By P. F. Williams. Sept., 1911.
158. Fattening beef calves in Alabama. By D. T. Gray and W. F. Ward. Oct., 1911.
159. Heading off boll-weevil panic. By W. E. Hinds. Dec., 1911.
160. Local fertilizer experiments with cotton in south Alabama in 1911. By J. F. Duggar, J. T. Williamson, L. L. Glover, and E. Hodson. Dec., 1911.
161. Lime for Alabama soils. By J. F. Duggar and M. J. Funchess. Dec., 1911.
162. Local fertilizer experiments with cotton in north Alabama in 1911. By J. F. Duggar, J. T. Williamson, L. L. Glover, and E. Hodson. Feb., 1912.
163. Steer feeding in Alabama. By D. T. Gray and W. F. Ward. Dec., 1911.
164. The cotton worm or "caterpillar" (*Alabama argillacea* Hubn.). By W. E. Hinds. Aug. 1, 1912.
165. Southern bur clover (*Medicago maculata*). By E. F. Cauthen. Aug. 20, 1912.
166. Curing meat on the farm. By D. T. Gray and L. W. Summers. Nov., 1912.
167. Wintering pregnant ewes in Alabama. By D. T. Gray and L. W. Shook. Nov., 1912.
168. Fattening hogs in Alabama. By D. T. Gray, L. W. Summers, and L. W. Shook. Dec., 1912.
169. Local fertilizer experiments with cotton in south Alabama in 1912. By J. F. Duggar, J. T. Williamson, and L. J. Hawley. Jan., 1913.
170. Local fertilizer experiments with cotton in north Alabama in 1912. By J. F. Duggar, J. T. Williamson, and L. J. Hawley. Feb., 1913.
171. The biology or life history of the cattle tick as determined at Auburn, Ala. By H. W. Graybill and W. M. Lewallen.—Dipping vats and dips. By C. A. Cary. Feb., 1913.
172. Black spot of roses. By F. A. Wolf. Feb., 1913.
173. Oats: Experiments on culture, varieties, and fertilization. By J. F. Duggar and E. F. Cauthen. Sept., 1913.
174. Local fertilizer experiments with cotton in south Alabama in 1913. By J. F. Duggar, J. T. Williamson, and L. J. Hawley. Dec., 1913.
175. Local fertilizer experiments with cotton in north Alabama in 1913. By J. F. Duggar, J. T. Williamson, and L. J. Hawley. Jan., 1914.
176. Reducing insect injury to stored corn. By W. E. Hinds. Feb., 1914.
177. Raising and fattening beef calves in Alabama. By D. T. Gray and W. F. Ward. Mar., 1914.
178. Boll weevil effect upon cotton production. By W. E. Hinds. July, 1914.
179. Wheat in Alabama. By J. F. Duggar and E. F. Cauthen. Sept., 1914.
180. Leaf spot and some fruit rots of peanut (*Arachis hypogaea* L.). By F. A. Wolf. Dec., 1914.



181. Local fertilizer experiments with corn in south Alabama in 1911, 1912, 1913, and 1914. By J. F. Duggar and J. T. Williamson. Dec., 1914.
182. Local fertilizer experiments with corn in north Alabama in 1911, 1912, 1913, and 1914. By J. F. Duggar and J. T. Williamson. Dec., 1914.
183. Irish potatoes. By J. C. C. Price. Jan., 1915.
184. Local fertilizer experiments with sweet potatoes. By J. F. Duggar and J. T. Williamson. May, 1915.
185. Dipping vat for hogs and dips; hog worms, lice and mange; hog lots, houses and water supply. By C. A. Cary. July, 1915.
186. The grass worm or fall army worm (*Laphygma frugiperda*, S. A.). By W. E. Hinds and J. A. Dew. Sept., 1915.
187. Cabbage. By J. C. C. Price and G. V. Stelzenmuller. Jan., 1916.
188. Boll weevil in Alabama. By W. E. Hinds. March, 1916.
189. Wilt resistant varieties of cotton. By E. F. Cauthen. April, 1916.
190. Citrus canker. By F. A. Wolf. May, 1916.
191. (Technical Bul. 1.) The effects of certain organic compounds on plant growth: Coumarin, vanillin, pyridine, quinoline, dihydroxystearic acid, pyrogallol, etc. By M. J. Funchess. June, 1916.
192. Cottonseed meal compared with velvet beans for fattening steers. By G. S. Templeton and E. Gibbens. Nov., 1916.
193. Peanuts: Tests of varieties and fertilizers. By J. F. Duggar, E. F. Cauthen, J. T. Williamson, and O. H. Sellers. Feb., 1917. For popular edition see 194.
194. Growing peanuts in Alabama. By J. F. Duggar, E. F. Cauthen, J. T. Williamson, and O. H. Sellers. Feb., 1917. Popular edition of 193.
195. (Technical Bul. 2.) The cause of the disappearance of coumarin, vanillin, pyridine, and quinoline in the soil. By W. J. Robbins. June, 1917.
196. (Technical Bul. 3.) The nitrification of pyridine, quinoline, guanidine carbonate, etc., in soils. By M. J. Funchess. June, 1917.
197. Harvesting and storing sweet potatoes. By J. C. C. Price. Sept., 1917. Also popular edition.
198. Velvet beans compared with cottonseed meal for fattening steers. By G. S. Templeton and Ernest Gibbens.—Velvet beans versus cottonseed meal and corn as feeds for dairy cattle. By G. S. Templeton and H. C. Ferguson.—Velvet bean pasture compared with corn and dried blood; velvet bean meal compared with corn for fattening hogs. By G. S. Templeton. Nov., 1917.
199. Report on freeze injury to citrus trees for 1916 and 1917, with notes on orange culture in south Alabama. By O. F. E. Winberg, G. C. Starcher, and C. L. Isbell. Mar., 1918.
200. Tests of varieties of corn at Auburn. By E. F. Cauthen. Mar., 1918.
201. (Technical Bul. 4.) The development of soluble manganese in acid soils as influenced by certain nitrogenous fertilizers. By M. J. Funchess. June, 1918.
202. Growing soy beans in Alabama. By E. F. Cauthen. June, 1918. A popular edition of 203.
203. Soy beans in Alabama. By E. F. Cauthen. Nov., 1918.
204. (Technical Bul. 5.) The destruction of vanillin in the soil by the action of soil bacteria. By W. J. Robbins. June, 1918.
205. Variety tests of wheat. By E. F. Cauthen. Sept., 1918.
206. Grazing peanuts with hogs versus marketing a crop of peanuts. By G. S. Templeton. Dec., 1918.
207. Local fertilizer experiments with cotton in south Alabama, 1914-1918, inclusive. By J. T. Williamson and J. F. Duggar. Dec., 1918.
208. Comparison of peanut meal, cottonseed meal, velvet bean meal, ammonium sulphate, and nitrate of soda as fertilizers for corn and cotton. By E. F. Cauthen. Feb., 1919.
209. Time of applying nitrate of soda to cotton: Experiments at Auburn, 1910-1916. By E. F. Cauthen.—Experiments in various Alabama counties, 1914-1919. By J. T. Williamson. Apr., 1920.
210. Time of applying nitrate of soda to corn: Experiments at Auburn, 1910-1916. By E. F. Cauthen.—Experiments in various Alabama counties, 1914-1919. By J. T. Williamson. Apr., 1920.
211. The grape (reprint). By J. C. C. Price. Dec., 1920.
212. Poisoning the boll weevil: Pt. I, Results for 1918 and 1919; Pt. II, results for 1920. By W. E. Hinds and F. L. Thomas. Nov., 1920.
213. Improving the quality of peanut-fed hogs by finishing in dry lot on corn and tankage, corn and cottonseed meal, corn and velvet beans. By G. S. Templeton. July, 1920.
214. Summary of investigations on effect of tile drains in the lime or prairie section of Alabama. By L. A. Jones. Nov., 1920.

## TECHNICAL BULLETINS.

Bulletins 191, 195, 196, 201, and 204 are also designated Technical Bulletins 1, 2, 3, 4, and 5, respectively.

## Canebrake Agricultural Experiment Station, Uniontown.

Established in 1885 as a branch of the station at Alabama Polytechnic Institute, q. v. for results prior to 1888; reorganized and established as a separate station in 1888.

## BULLETINS.

1. [Experiments with potatoes, peas, lettuce, beets, beans, clover.] July, 1888.
2. Report of assistant director: Experiments with cantaloupes; notes on tomatoes; keeping qualities of Irish potatoes; fruit trees. [By W. H. Newman.] Oct., 1888.
3. Report of assistant director: Corn; forage crops; drainage. [By W. H. Newman.] Jan., 1889.
4. Experiments with cotton; meteorology. By W. H. Newman. Apr., 1889.
5. Oats; wheat; meteorological report. By W. H. Newman. July, 1889.
6. Vegetables; grapes; meteorology; soil temperatures. [By W. H. Newman.] Oct., 1889.
7. Cotton; corn; peas; melilotus. [By W. H. Newman.] Feb., 1890.
8. Cattle feeding; pig feeding. By W. F. Newman. Apr., 1890.
9. Crops for ensilage; forage plants and grasses. By W. H. Newman. 1890.
10. Corn; meteorology; soil temperatures. By W. H. Newman. Dec., 1890.
11. Cotton; fertilizers; varieties. By W. H. Newman. Feb., 1891.
12. Grapes, strawberries and raspberries. Oct., 1891.
13. Experiments with corn. By W. H. Newman. Dec., 1891.
14. Cotton experiments. By W. H. Newman. July, 1892.
15. Cattle feeding. By W. H. Newman. July, 1892.
16. Potatoes, amounts of seed. By B. M. Duggar. July, 1893.
17. Grapes and some new fruits. By B. M. Duggar. July, 1893.
18. Cotton, corn, wheat, forage crops, and fruit. By H. Benton.—Diseases of animals treated. By J. F. Connor. Mar., 1895.
19. Tests with oats and wheat at Uniontown in 1903. By J. F. Duggar and J. M. Richeson. Aug., 1903.

20. Alfalfa, sorghum, soy beans, and other forage plants. By J. F. Duggar and J. M. Richeson. Dec., 1903.
21. Experiments with cotton and corn in 1903. By J. F. Duggar and J. M. Richeson. Jan., 1904.
22. Experiments with cotton, corn, and oats in 1904. By J. F. Duggar and J. M. Richeson. Jan., 1905.
23. Experiments with cotton and corn in 1905. By J. F. Duggar and J. M. Richeson. Jan., 1906.
24. Experiments with cotton and corn in 1906. By J. F. Duggar and J. M. Richeson. Jan., 1907.
25. Experiments with cotton and oats in 1907. By F. D. Stevens. Jan., 1908.
26. Fertilizer tests with cotton; cover crops; alfalfa yields. By F. D. Stevens. Jan., 1909.
27. [Monthly rainfall as recorded at the station for a period of nine years.]—Agricultural value of nitrogenous materials for cotton on the Houston clays, as determined by field trials; residual effect of cover crops; alfalfa—yields, and effect as a means of restoring fertility. By F. D. Stevens. Jan., 1910.

## ALASKA.

Alaska Agricultural Experiment Stations, Sitka, Kodiak, Rampart and Fairbanks.<sup>1</sup>

## BULLETINS.

1. Suggestions to pioneer farmers in Alaska. By C. C. Georgeson. 1902.
2. Vegetable growing in Alaska. By C. C. Georgeson. 1905.
3. Haymaking at Kenai experiment station. By P. H. Ross. Apr. 15, 1907.

## ARIZONA.

## Agricultural Experiment Station of the University of Arizona, Tucson.

## BULLETINS.

1. Arizona Agricultural Experiment Station. By F. A. Gulley. Dec., 1890.
2. I, Notes on some of the range grasses of Arizona; II, overstocking the range. By J. W. Toumey. Sept., 1891.
3. Irrigation in Arizona. By V. E. Stolbrand. Oct., 1891.
4. Waters and water analysis. By C. B. Collingwood. Nov., 1891.
5. Cañalgre (*Rumex hymenosepalus*). By F. A. Gulley. Apr., 1892.
6. Soils and waters. By C. B. Collingwood. Apr., 1892.
7. Cañalgre (*Rumex hymenosepalus*). By C. B. Collingwood, J. W. Toumey, and F. A. Gulley. Feb., 1893.
8. Cattle feeding. By F. A. Gulley and Matthew Moss. Mar., 1893.
9. Notes on insects and insecticides. By J. W. Toumey. Nov., 1893.
10. Experimental work at Willcox. By F. A. Gulley. Dec., 1893.
11. Agricultural development in southwestern Arizona; pumping water for irrigation. By F. A. Gulley and C. B. Collingwood. Dec., 1893.
12. Preliminary report of observations on the "crown knot." By J. W. Toumey. June, 1894.
13. The mesquite tree, its products and uses. By R. H. Forbes. Mar., 1894 [i. e. 1895].
14. Notes on scale insects in Arizona. By J. W. Toumey. June, 1895.
15. List of varieties of fruits. By W. S. Devol. June, 1895.
16. Notes on apricots at Phoenix Station. By W. S. Devol. June, 1895.
17. Agricultural convention, Part I, edited by W. S. Devol. Oct., 1895.
18. Agricultural convention, Part II, edited by W. S. Devol. Dec., 1895.
19. Sixth annual report, 1895.
20. Arizona weather. By E. M. Boggs. June, 1895.
21. Cañalgre. By R. H. Forbes. July, 1896.
22. Something about weeds. By J. W. Toumey. Jan., 1897.
23. Sugar beets. By W. S. Devol. Jan., 1897.
24. Seventh annual report, 1896. By W. S. Devol. Jan., 1897.
25. Eighth annual report, 1897. By W. S. Devol. June, 1897.
26. Sugar-beet experiments. By R. H. Forbes. Dec., 1897.
27. Arizona weather and climate. By E. M. Boggs and N. H. Barnes. Dec., 1897.
28. Salt River Valley soils. By R. H. Forbes. Mar., 1898.
29. The date palm. By J. W. Toumey. June, 1898.
30. Sugar-beet experiments during 1898. By A. J. McClatchie and R. H. Forbes. Jan., 1899.
31. Sugar beet experiments during 1899. By A. J. McClatchie. Dec., 1899.
32. Some insect pests of Salt River Valley and the remedies for them. By T. D. A. Cockerell. Dec., 1899.
33. An inquiry into the cause and nature of crown gall. By J. W. Toumey. Apr., 1900.
34. Timely hints for farmers [Nos. 1-18]. June, 1900.
35. Vegetable growing in southern Arizona. By A. J. McClatchie. Aug. 15, 1900.
36. Experimental work with sugar beets during 1900. By R. H. Forbes. Mar., 1901.
37. Winter irrigation of deciduous orchards. By A. J. McClatchie. Mar., 1901.
38. Timely hints for farmers [Nos. 19-34]. July, 1901.
39. Dairy herd records. By G. H. True. Aug., 1901.
40. Soil survey in Salt River Valley. By T. H. Means. May, 1902.
41. Irrigation at the station farm, 1898-1901. By A. J. McClatchie. May, 1902.
42. The cool side of a house in Arizona. By S. N. Woodward. June, 1902.
43. Utilizing our water supply. By A. J. McClatchie. July, 1902.
44. The river-irrigating waters of Arizona, their character and effects. By R. H. Forbes. Sept., 1902.
45. Timely hints for farmers [Nos. 35-41]. Nov., 1902.
46. The underground waters of Arizona, their character and uses. By W. W. Skinner. Oct., 1903.
47. Timely hints for farmers [Nos. 42-47]. Nov., 1903.
48. Relation of weather to crops. By A. J. McClatchie. June, 1904. See also 61.
49. Cost of pumping for irrigation. By S. M. Woodward. Nov., 1904.
50. Steer feeding experiments. By G. H. True and T. F. McConnell. May, 1905.
51. Timely hints for farmers [Nos. 48-54]. June, 1905.
52. *Alfilaria (Erodium cicutarium)* as a forage plant in Arizona. By J. J. Thornber. May, 1906.
53. Irrigating sediments and their effects upon crops. By R. H. Forbes. Sept., 1906.
54. Timely hints for farmers [Nos. 55-59]. Nov., 1906.

<sup>1</sup> Reports of agricultural investigations in Alaska, 1897-1900, were published as Office of Experiment Station Bulletins 48, 62, 82, 94. For other accounts of investigational work see the annual reports of the station.

55. Cement pipe for small irrigating systems and other purposes. By G. E. P. Smith. July, 1907.
56. Scale insects of the date palm. By T. D. A. Cockerell.—Extermination of date-palm scales. By R. H. Forbes. Sept., 1907.
57. Timely hints for farmers [Nos. 60-66]. Dec., 1908.
58. Citrus culture in the arid Southwest. By J. E. Coit. Dec., 1908.
59. Oleander poisoning of live stock. By F. W. Wilson. April, 1909.
60. Timely hints for farmers [Nos. 67-76]. June, 1909.
61. Relation of weather to crops and varieties adapted to Arizona conditions. By A. J. McClatchie and J. E. Coit. Oct., 1909. A revision of 48 pt. 3. See 78.
62. Olive culture and oil manufacture in the arid Southwest. By J. E. Coit. Dec., 24, 1909.
63. Irrigation and agricultural practice in Arizona. By R. H. Forbes. June 30, 1911.
64. Groundwater supply and irrigation in the Rillito Valley. By G. E. P. Smith. May 12, 1910.
65. The grazing ranges of Arizona. By J. J. Thornber. Sept. 21, 1910.
66. Chemistry and ripening of the date. By A. E. Vinson.—Ripening dates by incubation. By G. F. Freeman. May 1, 1911.
67. Native cacti as emergency forage plants. By J. J. Thornber.—Nutritive value of cholla fruit. By A. E. Vinson. Dec. 20, 1911.
68. Southwestern beans and teparies. By G. F. Freeman. Aug. 30, 1912. Revised reprint. Jan. 15, 1913.
69. Improved types of sheep for the Southwest. By F. W. Wilson.—The sheep of Tunis and Algeria. By A. E. Vinson. Nov. 30, 1912.
70. Dry-farming in the arid Southwest. By R. W. Clothier. Feb. 1, 1913.
71. Gasoline engine troubles and the care and operation of gasoline engines. By G. E. P. Smith. July 1, 1913.
71. [i. e. 72]. Agriculture of the Sulphur Spring Valley, Arizona. By R. H. Forbes. June 30, 1913.
73. Alfalfa in the Southwest. By G. F. Freeman. June 1, 1914.
74. Oil engines for pump irrigation and the cost of pumping. By G. E. P. Smith. Feb. 1, 1915.
75. Papago sweet corn, a new variety. By G. F. Freeman. May 1, 1915.
76. Walnut culture in Arizona. By J. J. Thornber. June 30, 1915.
77. Practical fig culture in Arizona. By W. H. Lawrence. June 1, 1916.
78. Relation of weather to crops and varieties adapted to Arizona conditions. By A. J. McClatchie, J. E. Coit, and the station staff. Oct. 20, 1916. A revision of 61.
79. Cold resistance in spineless cacti. By J. C. Th. Uphof.—Introduction. By J. J. Thornber. Dec. 1, 1916.
80. Certain effects under irrigation of copper compounds upon crops. By R. H. Forbes.—Appendix: Methods of analysis, with the collaboration of E. E. Free and W. H. Ross. Dec. 15, 1916.
81. How to combat rabbits, gophers, prairie dogs, coyotes, ants and grasshoppers. By A. L. Paschall. Nov., 15, 1917.
82. Johnson grass (*Sorghum halepense*) control. By H. C. Heard. Dec., 1917.
83. Poisonous animals of the desert. By C. T. Vorhies. Dec. 20, 1917.
84. Dry-farming in Arizona. By A. M. McOmie, C. R. Fullerup, and L. L. Bates. Edited and revised by H. C. Heard. Feb. 1, 1918.
85. A study of marketing conditions in the Salt River Valley, Arizona. By J. H. Collins. Mar. 1, 1918.
86. Machine-made cement pipe for irrigation systems and other purposes. By G. E. P. Smith. Oct. 30, 1918.
87. Insect pests of interest to Arizona cotton growers. By A. W. Morrill. Dec., 1918.
88. Use and waste of irrigation water. By G. E. P. Smith. May 15, 1919.
89. The Yuma mesa. By A. E. Vinson, F. J. Crider, and G. E. Thompson. Aug. 15, 1919.
90. Growing cotton in Arizona. By G. E. Thompson and C. J. Wood. Dec., 1919.
91. Fattening native steers for market, 1920. By R. H. Williams. Sept. 1, 1920.
92. The supply, the price, and the quality of fuel oils for pump irrigation. By G. E. P. Smith. Nov. 15, 1920.

## ARKANSAS.

## Arkansas Agricultural Experiment Station, Fayetteville.

## BULLETINS.

1. [Announcement of lines of work of the Station. By A. E. Menke].—Experiments on cotton and corn in Drew County. By F. M. Bordeaux [and A. E. Menke]. [1888?]
2. Diseases of animals. Apr., 1888.
3. [The peach tree borer and the codling moth, life, history, methods of attack and remedies.] By S. H. Crossman. Apr., 1888.
4. Commercial fertilizers. July, 1888.
5. Dehorning. By A. E. Menke, R. R. Dinwiddie, S. S. Twombly, and C. B. Collingwood. Aug., 1888.
6. Wheat; peas. Aug., 1888.
7. Horticulture: [Tests of varieties of grapes and strawberries.] Nov., 1888.
8. Spaying of cattle. Apr., 1889.
9. Cotton seed hulls for fattening. May, 1889.
10. Entomological notes. By C. W. Woodworth.—Chemical fertilizers. June, 1889.
11. Strawberries; wheat; oats. Sept., 1889.
12. Influence of spaying on milk production; milk analysis.—Entomology. By C. W. Woodworth. Apr., 1890.
13. Strawberries. By Jerome MacNeill. Aug., 1890.
14. The effects of the arsenites upon plants. By C. W. Woodworth. Sept., 1890.
15. Some new insecticides and their effect on cotton worms. [By G. C. Davis.] Dec., 1890.
16. Ringworm. Nature and treatment of a prevalent skin disease of young cattle. [By R. R. Dinwiddie.] July, 1891.
17. Horticulture: Grapes, strawberries, raspberries, plums, [Le Conte and Keifer pears]. [By J. F. McKay. Oct., 1891.
18. Some cotton experiments at Newport. By R. L. Bennett. Feb., 1892.
19. Manures and some principles in farm manuring. By G. L. Teller. May, 1892.
20. Animal parasitism; some Texas fever experiments. By R. R. Dinwiddie. Nov., 1892.
21. Horticulture: Grapes, some insects and fungous diseases and their remedies; spraying apparatus; apples and grapes in Arkansas. By J. T. Stinson. Dec., 1892.
22. Sorghum and sugar-cane culture; sirup and sugar making on small farms; some field experiments with cantaloupes and corn. By C. L. Newman. Dec., 1892.
23. Cotton. By R. L. Bennett and G. B. Irby. Mar., 1893.
24. Fodder; the fertilizing value of the cowpea. By G. L. Teller. July, 1893.

25. Animal pathology: Unsound corn and forage as a cause of disease in live stock; colics in horses and mules some further experiments with Texas cattle fever. By R. R. Dinwiddie. Dec., 1898.
26. Horticulture: [Apples]. By J. T. Stinson. Jan., 1894.
27. Agriculture, experiments at the Northeast Station: Late crops for overflow lands; corn varieties for all sections of the State; corn culture; rotation of crops; cotton; Egyptian varieties; cotton culture; stack frame for curing and storing cowpea hay; cowpea hay; forage plants; oats for hay. By R. L. Bennett and G. B. Irby. Mar., 1894.
28. Agriculture, experiments at the Southern Branch Station: Rye for green winter feeding; fertilizer experiments with rye; onions from seed; salsify, or oyster plant; fall raised Irish potatoes; preparation of soil for cotton; Bermuda grass; pocket gopher; moles. By C. L. Newman. June, 1894.
29. Agriculture: Wheat experiments on sandy loam soil at Newport Substation; some grass experiments on clay loam soil at Fayetteville. By R. L. Bennett and G. B. Irby. July, 1894.
30. Stock feeding. By G. L. Teller. Sept., 1894.
31. Agriculture, experiments at Northeast Substation: Fattening mature steers on cotton seed and cowpea hay; cowpeas; sweet potatoes; peanuts; cotton varieties; minor miscellaneous subjects. By R. L. Bennett and G. B. Irby. Dec., 1894.
32. Farm drainage. By C. L. Newman. Dec., 1894.
33. Insects: Insects injurious to fruits and vegetables and remedies for destroying them. By J. T. Stinson. Jan., 1895.
34. Vegetable gardening: Experiments at the Southern Branch Station. By C. L. Newman. Jan., 1895.
35. Animal pathology: Vermineous bronchitis; parturient apoplexy of cows; hog cholera and other swine diseases; tuberculosis of cattle; glanders in horses and mules. By R. R. Dinwiddie. Apr., 1895.
36. Grasses and clovers. By R. L. Bennett. May, 1895.
37. Sirups and molasses. By G. L. Teller and J. F. Moore. Nov., 1895.
38. Irish potatoes. By C. L. Newman. Jan., 1896.
39. Spraying fruits: Strawberries, grapes. By J. T. Stinson. Jan., 1896.
40. On the toxic properties of molds. By R. R. Dinwiddie.—Field investigations of various stock diseases. By H. V. Goode. May, 1896.
41. Pork production on crops gathered by hogs; a succession of crops for hogs. By R. L. Bennett. Aug., 1896.
42. Concerning wheat and its mill products. By G. L. Teller. Oct., 1896. Issued in two forms, one containing only Pt. I, p. 59-74, the other having two parts including p. 59-104.
43. Report of the horticulturist, 1896. By J. T. Stinson. Dec., 1896.
44. Vegetable gardening. By C. L. Newman. Jan., 1897.
45. Milk, its decomposition and preservation. By R. R. Dinwiddie. May, 1897.
46. Experiments with manures and rotation for improving worn cotton soils; experiments on beef and pork production in connection therewith. By R. L. Bennett. July, 1897.
47. Concerning fertilizers and manures; after-effect of manures. By G. L. Teller. Oct., 1897.
48. Strawberries. By J. T. Stinson. Nov., 1897.
49. Preliminary report on Arkansas seedling apples. By J. T. Stinson. Jan., 1898.
50. Some Irish potato experiments. By C. L. Newman. Jan., 1898.
51. Methods of combating communicable diseases of farm animals. By R. R. Dinwiddie. May, 1898.
52. Feeding value to steers of cotton seed, ground cottonseed, cotton meal, and hulls; effect of temperature. By R. L. Bennett. July, 1898.
53. A report of progress of investigations in the chemistry of wheat. By G. L. Teller. Sept., 1898.
54. Some experiments on the fattening value of certain foods gathered by pigs. By R. L. Bennett. Dec., 1898.
54. Supplementary circular: Pork and beef as money crops for cotton farmers, also as crops for improving soils for succeeding crops of cotton. By R. L. Bennett. [n. d.].
55. Orchard cultivation. By J. T. Stinson. Dec., 1898.
56. Tomatoes, cabbage, and onions. By C. L. Newman. Mar., 1899.
57. The relative virulence for the domestic animals of human and bovine tubercle: I, Bibliographical review; II, Experimental researches. By R. R. Dinwiddie. June, 1899. See also 63.
58. An experiment in grazing a corn and cowpea field with steers; experiments with peanuts, legume manuring, cotton meal, whole and crushed cottonseed manuring, and varieties of cotton. By R. L. Bennett. Aug., 1899.
59. The comparative yield of corn from seed of the same variety grown in different latitudes. By C. L. Newman. Dec., 1899.
60. Second report on Arkansas seedling apples. By J. T. Stinson. Dec., 1899.
61. Annual plants for summer hay and pasture, for winter hay and pasture, and for forage or coarse fodder; permanent plants for meadow and pasture; special crops for pig grazing. By R. L. Bennett. July, 1900.
62. Wheat experiments. By C. L. Newman. Nov., 1900.
63. The relative susceptibility of the domestic animals to the contagia of human and bovine tuberculosis. By R. R. Dinwiddie. Dec., 1900. A sequel to 57. Also popular edition.
64. Notes on celery. By Ernest Walker. Dec., 1900.
65. Pig feeding experiments. By R. L. Bennett. Dec., 1900.
66. Oat experiments. By C. L. Newman. 1901.
67. Investigations of swine diseases in Arkansas. By R. R. Dinwiddie. 1901.
68. Soil improvement and forage experiments. By R. L. Bennett. 1901.
69. Some muskmelon experiments. By Ernest Walker. 1901.
70. Cowpea experiments. By C. L. Newman. 1901.
71. Why apple trees fail. By Ernest Walker. 1902.
72. Sweet potato experiments. By C. L. Newman. 1902.
73. Pork production experiments and hog ranching. By R. L. Bennett. 1902.
74. The phosphate rocks of Arkansas. By J. C. Branner and J. F. Newsom. 1902.
75. Alfalfa. By R. L. Bennett. 1902.
76. Pig feeding experiments with cottonseed meal. By R. R. Dinwiddie. 1903.
77. Cowpea experiments. By C. L. Newman. 1903.
78. Experiments with edible oils. By J. F. Moore. 1903.
79. Peach growing in Arkansas. By Ernest Walker. 1903. Second edition. 1909.
80. Cowpea hay. By C. L. Newman. 1903.
81. Fertilizers. By A. M. Muckenfuss. 1904.
82. Livestock sanitation in Arkansas. By R. R. Dinwiddie. 1904.
83. Broom corn suggestions. By C. L. Newman. 1904.
84. Peanuts. By C. L. Newman. 1904.
85. Cotton food-products in hog feeding. By R. R. Dinwiddie. 1904.
86. Asparagus and salt; asparagus growing in Arkansas; rhubarb in Arkansas. By Ernest Walker.—Fertilizers registered for sale in Arkansas during 1905. By A. M. Muckenfuss. 1905.

87. Glanders of horses. By R. R. Dinwiddie. 1905.
88. Food adulteration in Arkansas. By J. H. Norton. 1905.
89. Rice growing in Arkansas. By W. G. Vincenheller. 1906.
90. The cattle tick in Washington and Benton Counties. By W. G. Vincenheller. 1906.
91. Suggestions upon the care of apple orchards. By Ernest Walker. 1906.
92. Some insects of orchard and other fruits. By C. F. Adams. 1907.
93. Cattle tick eradication in northwest Arkansas. By W. G. Vincenheller. 1907.
94. Rice culture. By R. J. Nelson. 1907.
95. Notes on spraying and suggestions for combatting crop pests. By Ernest Walker. 1907.
96. Anthrax in Arkansas. By R. R. Dinwiddie. 1907.
97. Anthrax and anthrax vaccines. (Technical.) By R. R. Dinwiddie. 1907.
98. Rice. By R. J. Nelson. 1908.
99. Farm poultry. By W. S. Jacobs. 1908.
100. Meteorological summary, 1891-1907. By J. H. Norton. 1908.
101. Notes on the cattle tick and tick fever of cattle. By R. R. Dinwiddie.—Tick eradication in Arkansas in 1907. By W. Lenton. 1908.
102. The San José scale in Arkansas, a bulletin of information. By C. F. Adams. 1908.
103. The deposition of fat and lean in hogs. By R. R. Dinwiddie and A. K. Short. 1909.
104. Farm drainage. By C. P. Norgord. 1909.
105. Studies on the bacteriology of infectious swine diseases. (Technical.) By R. R. Dinwiddie and J. F. Stanford. 1910.
106. Livestock sanitary laws of the State of Arkansas. By W. Lenton. 1910.
107. The San José scale and how to control it. By Paul Hayhurst. 1911.
108. Cottonseed poisoning of live stock. By R. R. Dinwiddie and A. K. Short. 1911.
109. Diseases of apple trees and fruit caused by fungi and insects. By J. L. Hewitt and Paul Hayhurst. 1911.
110. Rice blight. By J. L. Hewitt. 1912.
111. The infectiousness of serum and serum-free blood corpuscles in hog cholera. (Technical.) By R. R. Dinwiddie. 1912.
112. An unknown apple tree disease. By J. L. Hewitt and H. E. Truax. 1912.
113. Twig blight and blossom blight of the apple. By J. L. Hewitt. 1913.
114. Spraying investigations for 1912. By J. L. Hewitt. 1913.
115. Corn improvement. By C. V. Ruzek.—Varieties of corn adapted to Arkansas. By Martin Nelson and C. V. Ruzek. Sept., 1913.
116. Varieties of fruit for Arkansas. By H. E. Truax. Jan., 1914.
117. Significance of bacterial infection in hog cholera. (Technical.) By R. R. Dinwiddie. May, 1914.
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119. Tick eradication in Arkansas. By R. M. Gow. July, 1914.
120. Studies on the hematology of normal and cholera-infected hogs. (Technical.) By R. R. Dinwiddie. Oct., 1914.
121. Report of cultural and variety tests with wheat. By Martin Nelson and L. W. Osborn. Jan., 1915.
122. Strawberry growing in Arkansas. By W. H. Wicks. Feb., 1915.
123. The relation of fruit growing to soil fertility. (Technical.) By R. C. Thompson. May, 1916.
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125. Biochemical changes in cottonseed in storage. (Technical.) By J. B. Rather. Mar., 1916.
126. Livestock sanitary laws of the State of Arkansas; State laws and regulations of the board of control; notes on these laws and regulations. By R. M. Gow. 1916.
127. Farm sanitation. By C. L. McArthur. March, 1916.
128. Fattening swine on rice by-products. By H. E. Dvorachek. June, 1916.
129. Varieties of cotton, 1916. By W. E. Ayres. June, 1917.
130. Corn variety tests 1915 and 1916. By L. W. Osborn. Mar., 1917.
131. The inosite-phosphoric acids of cottonseed meal. (Technical.) By J. B. Rather. March, 1917.
130. [i. e. 132]. Tick eradication laws and regulations of the State of Arkansas; State laws and regulations of the board of control; notes on these laws and regulations. By R. M. Gow. 1917.
133. The digestibility of some Arkansas feeds for hogs. By J. B. Rather. Apr., 1917.
134. Blooming period of the apple in northwest Arkansas. By W. H. Wicks. May, 1917.
135. The determination of phytin phosphorus in plant products. (Technical.) By J. B. Rather. Aug., 1917.
136. Tuberculosis in farm animals. By C. L. McArthur. Aug., 1917.
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138. The nature of the inosite phosphoric acids of some feeding materials. (Technical.) By J. B. Rather. Dec., 1917.
139. The attenuation of hog cholera virus and its effect upon normal hogs. (Technical.) By C. L. McArthur. Nov., 1917.
140. An accurate loss-on-ignition method for determination of organic matter in soils. (Technical.) By J. B. Rather. Dec., 1917.
141. The dormant spray for the San José scale. By G. G. Becker. Jan., 1918.
142. Soft pork from rice bran. By H. E. Dvorachek and H. A. Sandhouse. Mar., 1918.
143. The effect of cross-pollination on size, color, shape, and quality of the apple. (Technical.) By W. H. Wicks. Mar., 1918.
144. Storage rots of sweet potatoes. By J. A. Elliott. May, 1918.
145. Varieties of cotton, 1917. By W. E. Ayres. May, 1918.
146. The round-headed apple-tree borer (*Saperda candida* Fab.). (Technical.) By G. G. Becker. July, 1918.
147. The utilization of phytin phosphorus by the pig. (Technical.) By J. B. Rather. May, 1918.
148. Not published.
149. Arkansas peach diseases. By J. A. Elliott. June, 1918.
150. The peach-tree borer (*Sanninoidea exilis* Say). (Technical.) By G. G. Becker. June, 1918.  
Includes data previously published in Jour. Econ. Ent., 10 (1917), No. 1, p. 49-59.
151. Immunity of suckling pigs to hog cholera. (Technical.) By C. L. McArthur. July, 1918.
152. Preserving eggs for winter use. By H. E. Dvorachek and S. R. Stout. July, 1918.
153. Cotton spacing experiments. By W. E. Ayres. July, 1918.
154. The apple woolly aphis (*Eriosoma lanigera* Haus.). (Technical.) By G. G. Becker. July, 1918.
155. Results of fertilizer experiments in Arkansas. By De F. Hungerford. Oct., 1918.
156. The identification of acids of agricultural products. (Technical.) By J. B. Rather and E. E. Reid. Aug., 1918.
157. Varieties of cotton, 1909-1917. By W. E. Ayres. Dec., 1918.
158. Nature and progress of the work of the agricultural experiment station. By Martin Nelson. Dec., 1918.  
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159. Varieties of cotton, 1918. By W. E. Ayres. Mar. 1919.

160. Tick eradication laws. By R. C. Knox.—Regulations of the board of control, with notes on these laws and regulations. By R. M. Gow. 1919.
161. Cultural experiments with cotton, 1918. By W. E. Ayres. Mar. 1919.
162. A bacterial root rot of field corn. (Technical.) By H. R. Rosen. Aug., 1919.
163. The influence of age of hens on egg production. By H. E. Dvorachek and S. R. Stout. May, 1919.
164. Silos and silage in Arkansas. By H. E. Dvorachek. June, 1919.
165. Report of oats experiments, 1908-1919. By Martin Nelson and L. W. Osborn. Feb., 1920.
166. Varieties of cotton, 1919. By Martin Nelson and E. A. Hodson. Feb., 1920.
167. The mosaic disease of sweet potatoes. By H. R. Rosen. April, 1920.
168. Lint frequency in cotton with a method for determination. By E. A. Hodson. Feb., 1920.
169. Correlations of certain characters in cotton. By E. A. Hodson. June, 1920.
170. Beekeeping in Arkansas. By W. J. Baerg. June, 1920.
171. Results of seven years' pedigree selection in Trice cotton. By E. A. Hodson. June, 1920.
172. Making Bordeaux mixture, and some other spraying problems. By W. S. Fields and J. A. Elliott. July, 1920.

## CALIFORNIA.

## Agricultural Experiment Station of the University of California, Berkeley.

## BULLETINS.

1. Examination of the water of the San Fernando tunnel, Los Angeles County. By E. W. Hilgard. [Jan., 1884.]
2. [Plant distribution.] By E. W. Hilgard. Jan. 15, 1884.
3. [Remedies for phylloxera;] failure of cuttings. By E. W. Hilgard. Jan. 17, 1884.
4. [Analysis of tanning materials.] By E. W. Hilgard. Jan., 1884.
5. Notice regarding distribution of plants. By E. W. Hilgard. Feb., 1884.
6. Comparative examination of claret grapes from Fresno and Livermore Valley. By E. W. Hilgard. Feb., 1884.
7. Examination of irrigation waters. By E. W. Hilgard. Feb., 1884.
8. Examinations of fertilizing materials; examinations of soils. By E. W. Hilgard. Mar., 1884.
9. Examination of Zinfandel wines. By E. W. Hilgard. Apr., 1884.
10. Examination of soils. By E. W. Hilgard. Apr., 1884.
11. Concerning the census report "On the physical and agricultural features of California." By E. W. Hilgard. May, 1884.
12. Examination of Zinfandel wines. By E. W. Hilgard. May, 1884.
13. Examinations of red or claret wines. By E. W. Hilgard. May, 1884.
14. Examinations of artesian waters from the San Joaquin Valley. By E. W. Hilgard. Aug., 1884.
15. Examinations of soils from southern California. By E. W. Hilgard. Aug., 1884.
16. Entomology in the college of agriculture. By C. H. Dwinelle. Sept., 1884.
17. The muscat grape on the southern mesas. By E. W. Hilgard. [Sept., 1884.]
18. Mr. J. A. Bauer's phylloxera remedy. By E. W. Hilgard. Oct., 1884.
19. Observations on the phylloxera made during 1884. By F. W. Morse. Oct., 1884.
20. Examination of stream and well waters. By E. W. Hilgard. Oct., 1884.
21. Examination of red wines from Sonoma and Napa Counties. [1884?]
22. University seed distribution. By C. H. Dwinelle. Nov., 1884.
23. Vintage work in the viticultural laboratory, 1884. By E. W. Hilgard. Nov., 1884.
24. Examinations of grape-growing soils. By E. W. Hilgard. [Nov., 1884.]
25. Examinations of Alameda County vineyard soils. By E. W. Hilgard. [1884?]
26. Examinations of miscellaneous vegetable substances. By E. W. Hilgard. Dec., 1884.
27. Examination of soils from the Northern Coast Range Region. By E. W. Hilgard. Dec., 1884.
28. Examinations of tule, marsh, and alkali soils. By E. W. Hilgard. [1884?]
29. Distribution of plants and scions. By E. W. Hilgard. Dec., 1884.
30. [i. e. 30]. Concerning specimens sent for examination; examinations of various upland soils. [1884?]
31. Examination of Trosseau and Burger wines. By E. W. Hilgard. Jan., 1885.
32. Examinations of well and spring waters. By E. W. Hilgard. Feb., 1885.
33. Examinations of soils and waters. By E. W. Hilgard. Feb., 1885.
34. Experiments on the growth of cuttings from wild American vines. By E. W. Hilgard. Mar., 1885.
35. Investigations of wines from rare grape varieties. By E. W. Hilgard. Apr., 1885.
36. Examinations of soils and subsoils. By E. W. Hilgard. Apr., 1885.
37. Investigations of wines from rare grape varieties. By E. W. Hilgard. Apr., 1885.
38. Investigations of wines from rare grape varieties. By E. W. Hilgard. Apr., 1885.
39. Analyses of oranges and lemons from the Riverside citrus fair, Mar., 1845, [i. e. 1885]. By E. W. Hilgard. May, 1885.
40. [Investigations of wines from rare grape varieties.] By E. W. Hilgard. May, 1885.
41. The olive. By W. G. Klee. June, 1885.
42. Vintage work in the viticultural laboratory, 1885. By E. W. Hilgard. Aug., 1885.
43. Analyses of Santa Clara Valley red wines. By E. W. Hilgard. Sept., 1885.
44. The "bed-rock lands" of Sacramento County. By E. W. Hilgard. Oct., 1885.
45. Grafting the California wild vine. By E. W. Hilgard and J. E. Packard. Oct., 1885.
46. Grafting and fruiting of resistant vines. By E. W. Hilgard and G. Husmann. Oct., 1885.
47. Seed distribution. By E. W. Hilgard. [1885?]
48. Investigations upon the mercurial phylloxera remedy. By E. W. Hilgard. Nov., 1885.
49. Examinations of soils from the bay region. By E. W. Hilgard. Dec., 1885.
50. Distribution of plants and scions. By E. W. Hilgard. Dec., 1885.
51. The wines of 1885. By E. W. Hilgard. Jan., 1886.
52. Alkaline washes for fruit trees. By E. W. Hilgard. Feb., 1886.
53. Irrigation, drainage and alkali. By E. W. Hilgard. Feb., 1886.
54. Condensed grape must and its uses. By E. W. Hilgard. Apr., 1886.
55. The woolly aphis and its repression. By W. G. Klee. May, 1886.
56. Whale-oil soap insecticide washes; the sulphuring of vines. By E. W. Hilgard. May, 1886.
57. Vintage work and instruction in the viticultural laboratory, 1886. By E. W. Hilgard. Aug., 1886.
58. The Hessian fly and resistant grains. By E. J. Wickson. Oct. 1886.
59. [The experimental vineyard at Cupertino.] By E. W. Hilgard. Nov., 1886.
60. Colorimetric measurement of wines. By E. W. Hilgard. Dec., 1886.
61. Distribution of seeds and plants. By E. W. Hilgard. Dec., 1886.
62. Distribution of cuttings and scions. By E. W. Hilgard. Dec., 1886.
63. Experiments on methods of fermentation. By E. W. Hilgard. Jan., 1887
64. Planting and grafting resistant vines. By E. W. Hilgard. Jan., 1887.
65. Shall California make sophisticated wines? By E. W. Hilgard. Feb., 1887.

66. The principles and practice of pasteurizing. By E. W. Hilgard. Feb., 1887.
67. Misconception of the university viticultural work. By E. W. Hilgard. Mar., 1887.
68. University distribution of seeds, plants, etc. By E. J. Wickson.—Influence of the mode of fermentation on the color of wines. By E. W. Hilgard. Apr., 1887.
69. Wine colors and color wines. By E. W. Hilgard. May, 1887.
70. Abnormal deposits on wine leaves; mysterious death of vines; remedy for the anthracnose of vines. By E. W. Hilgard. June, 1887.
71. The use of gases against scale insects. By F. W. Morse. June, 1887.
72. Sugar beets at Fresno. By E. W. Hilgard.—The Hessian fly and resistant grains. By E. J. Wickson. Aug., 1887.
73. The use of hydrocyanic acid against scale insects. By F. W. Morse. Aug., 1887.
74. Vintage work and instruction in the viticultural laboratory, 1887; the choice of resistant stocks. By E. W. Hilgard. Aug., 1887.
75. Spray and band treatments for the codling moth. By E. J. Wickson.—Difficult fermentations. By E. W. Hilgard. Nov., 1887.
76. Distribution of seeds and plants. By E. W. Hilgard. Dec., 1887.
77. The extraction of color and tannin during red-wine fermentation. By E. W. Hilgard. Dec., 1887.
78. Report on the establishment of outlying stations. By E. W. Hilgard. Mar., 1888.
79. Experiments on the cause and avoidance of injury to foliage in the hydrocyanic gas treatment of trees. By F. W. Morse. May, 1888.
80. Progress of the experiment station work. By E. W. Hilgard. Aug., 1888.
81. Distribution of seeds and plants. By E. J. Wickson. Dec., 1888.
82. The lakes of San Joaquin Valley. By E. W. Hilgard. June, 1889.
83. The rise of the alkali in the San Joaquin Valley. By E. W. Hilgard. Nov., 1889.
84. Distribution of seeds and plants. By E. J. Wickson. Dec., 1889.
85. Observations on olive varieties. By W. G. Klee. Feb., 1890.
86. Preservation fluids for fresh fruits; the sulphuring of dried fruits. By E. W. Hilgard. May, 1890.
87. The conservation of wines. By E. W. Hilgard. June, 1890.
88. The use of fertilizers in California. Oct., [1890].
89. Distribution of seeds and plants. By E. J. Wickson. Dec., 1890.
90. Fiber plants for California. By E. W. Hilgard.—Flax for seed and fiber. By E. J. Wickson. Jan., 1891.
91. Port and sherry grapes in California; importation of Italian grapes; importation of olives. By E. W. Hilgard. Feb., 1891.
92. Notes on California olives, their adaptations and oils. By L. Pargparelli. Mar., 1891.
93. Investigation of California oranges and lemons. By G. E. Colby and H. L. Dyer. June, 1891.
94. Composition of the ramie plant. By M. E. Jaffa.—The fertilizing value of greasewood. By E. W. Hilgard. Sept., 1891.
95. Distribution of seeds and plants. By E. J. Wickson. Dec. 1891.
96. Sulphuring in fruit drying. By E. W. Hilgard.—Fig trees at the experiment stations; notes on Persian palms. By C. H. Shinn. Jan., 1892.
97. Investigation of California prunes, apricots, and peaches. By G. E. Colby. [1892?].
98. Distribution of seeds and plants. By E. J. Wickson. Dec., 1892.
99. Root knots on fruit trees and vines; a new nozzle tester. By C. W. Woodworth. Dec., 1892.
100. Investigation of cattle foods of California. By M. E. Jaffa. Feb., 1893.
101. Further examination of California prunes, apricots, plums, and nectarines. By G. E. Colby. May, 1893.
102. Analysis of figs and fig soils. By M. E. Jaffa and G. E. Colby. June, 1893.
103. Distribution of seeds and plants. By E. J. Wickson. Dec., 1893.
104. Investigations of California olives and olive oils. By A. P. Hayne. Apr., 1894.
105. The canaigre, or tanners' dock. By E. W. Hilgard.—Australian saltbush for alkali soils. By M. E. Jaffa. Oct., 1894.
106. Distributions of seeds, plants, and scions. By E. J. Wickson. Dec., 1894.
107. The Russian thistle in California. By C. H. Shinn. May, 1895.
108. The distribution of the salts in alkali soils. By E. W. Hilgard and R. H. Loughridge. Aug., 1895.
109. Distribution of seeds and plants. By E. J. Wickson. Nov., 1895.
110. The study of human foods and practical dietetics. By M. E. Jaffa. Feb., 1896.
111. The work of the College of Agriculture and experiment stations. By E. W. Hilgard. Sept., 1896.
112. Distribution of seeds and plants. By E. J. Wickson. Nov., 1896.
113. California walnuts, almonds, and chestnuts: Their composition and draft upon the soil. By G. E. Colby.—The bleaching of nuts by dipping. By E. W. Hilgard. Nov., 1896.
114. The causes of "frogging" and "bloating" of prunes. By F. T. Bioletti. Dec., 1896.
115. Remedies for insects and fungi. By C. W. Woodworth. Dec., 1896. Revised. Feb., 1898.
116. The California vine hopper. By C. W. Woodworth. May, 1897.
117. The control of the temperature in wine fermentation. By A. P. Hayne. July, 1897.
118. Distribution of seeds and plants. By E. J. Wickson. Dec., 1897.
119. Vine pruning. By F. T. Bioletti. Dec., 1897.
120. The olive knot. By F. T. Bioletti. Mar., 1898.
121. The conservation of soil moisture and economy in the use of irrigation water. By E. W. Hilgard and R. H. Loughridge. Aug., 1898.
122. Orchard fumigation. By C. W. Woodworth. Jan., 1899.
123. Olives: Cultivation, oil making, pickling, diseases. By F. T. Bioletti.—Varieties and their adaptation. By G. E. Colby. Jan., 1899. See 137.
124. Lupins for green-manuring. By J. B. Davy. May, 1899.
125. Australian saltbushes, results of eighteen years' tests: Characteristics, propagation, and field experiments. By C. H. Shinn.—Composition and food value. By M. E. Jaffa. May, 1899.
126. Paris green for the codling moth. By C. W. Woodworth.—Examination of Paris green and some other arsenical spraying materials. By G. E. Colby. 1899.
127. Bench-grafting resistant vines. By F. T. Bioletti and A. M. Dal Piaz. 1900.
128. Nature, value, and utilization of alkali lands. By E. W. Hilgard. Mar., 1900. See 133.
129. Report on the condition of olive culture in California. By A. P. Hayne and E. W. Hilgard. May, 1900.
130. Preservation of unfermented grape must. By F. T. Bioletti and A. M. Dal Piaz. Aug., 1900.
131. The phylloxera of the vine. By F. T. Bioletti. May, 1901.
132. Feeding of farm animals. By M. E. Jaffa and Le Roy Anderson. June, 1901.
133. Tolerance of alkali by various cultures. By R. H. Loughridge. Aug., 1901. Revised in conjunction with 128.
134. Report on condition of vineyards in portions of Santa Clara Valley. By F. T. Bioletti and E. H. Twilight. Sept., 1901.
135. The potato worm in California (*Gelechia operculella* Zeller). By W. T. C. Clarke. Oct., 1901.

136. Erinose of the vine. By F. T. Bioletti and E. H. Twight. Nov., 1901.
137. Pickling ripe and green olives. By F. T. Bioletti. Dec., 1901. Revised in conjunction with 123.
138. Citrus fruit culture. By J. W. Mills. Jan., 1902.
139. Orange and lemon rot. By C. W. Woodworth. Feb., 1902.
140. Lands of the Colorado delta in the Salton basin. By F. J. Snow, E. W. Hilgard, and G. W. Shaw. Feb., 1902.—Supplement. The native vegetation and crops of the Colorado delta in the Salton basin. By J. Burt-Davy. Apr., 1902.
141. Experiments with deciduous fruits at and near the Southern Coast Range Substation, Paso Robles, from 1889 to 1902. By C. H. Shinn. June, 1902.
142. Grasshoppers in California. By C. W. Woodworth. Aug., 1902.
143. The California peach-tree borer. By C. W. Woodworth. Sept., 1902.
144. The peach worm. By W. T. Clarke. Sept., 1902.
145. The red spider of the citrus trees. By C. W. Woodworth. Nov., 1902.
146. New methods of grafting and budding vines. By E. H. Twight. Nov., 1902.
147. Culture work at the substations, 1899-1901. By C. H. Shinn. June, 1902.
148. Resistant vines and their hybrids. By E. H. Twight. Oct., 1902.
149. The California sugar industry: I, Historical and general. By G. W. Shaw. May, 1903.
150. The value of oak leaves for forage. By W. W. Mackie. Apr., 1903.
151. Arsenical insecticides. By G. E. Colby. May, 1903.
152. Fumigation dosage. By C. W. Woodworth. June, 1903.
153. Spraying with distillates. By W. H. Volck. June, 1903.
154. Sulphur sprays for red spiders. By W. H. Volck. June, 1903.
155. Directions for spraying for the codling moth. By C. W. Woodworth. Mar., 1904.
156. Fowl cholera. By A. R. Ward. Apr., 1904.
157. Commercial fertilizers. By G. Roberts. Apr., 1904.
158. California olive oil: Its manufacture. By G. W. Shaw. June, 1904.
159. Contribution to the study of fermentation, I. By E. H. Twight and C. S. Ash. June, 1904.
160. The hop aphid. By W. T. Clarke. June, 1904.
161. Tuberculosis in fowls. By A. R. Ward. June, 1904.
162. Commercial fertilizers. By George Roberts. Dec., 1904.
163. Pear scab. By R. E. Smith. Dec., 1904.
164. Poultry feeding and proprietary foods. By M. E. Jaffa. Jan., 1905.
165. Asparagus and asparagus rust in California. By R. E. Smith. Jan., 1905.
166. Spraying for scale insects. By H. J. Quayle. Apr., 1905.
167. Manufacture of dry wines in hot countries. By F. T. Bioletti. Apr., 1905.
168. Observations on some vine diseases in Sonoma County, California. By O. Butler. May, 1905.
169. Field observations upon the tolerance of the sugar beet for alkali. By G. W. Shaw. May, 1905.
170. Studies in grasshopper control. By J. S. Hunter. June, 1905.
171. Commercial fertilizers. By George Roberts. June, 1905.
172. Further experience in asparagus rust control. By R. E. Smith. Jan., 1906.
173. Commercial fertilizers. By George Roberts. Dec., 1905.
174. A new wine-cooling machine. By F. T. Bioletti. Jan., 1906.
175. Tomato diseases in California. By R. E. Smith. Jan., 1906.
176. Sugar beets in the San Joaquin Valley. By G. W. Shaw. Jan., 1906.
177. A new method of making dry red wine. By F. T. Bioletti. Feb., 1906.
178. Mosquito control. By H. J. Quayle. July, 1906.
179. Commercial fertilizers. By George Roberts. June, 1906.
180. Resistant vineyards, grafting, planting, cultivation. By F. T. Bioletti. 1906.
181. The selection of seed wheat. By G. W. Shaw. Oct., 1906.
182. Analyses of Paris green and lead arsenate. By G. E. Colby.—Proposed insecticide law. By C. W. Woodworth. Dec., 1906.
183. The California tussock moth. By W. H. Volck. Dec., 1906.
184. Report of the plant pathologist to July 1, 1906. By R. E. Smith. Jan., 1907.
185. Report of progress in cereal investigations. By G. W. Shaw. Jan., 1907.
186. Oidium or powdery mildew of the vine. By F. T. Bioletti. Feb., 1907.
187. Commercial fertilizers. By J. S. Burd. Jan., 1907.
188. Lining of ditches and reservoirs to prevent seepage losses. By Elwood Mead and B. A. Etcheverry. June, 1907.
189. Commercial fertilizers. By J. S. Burd. June, 1907.
190. The brown rot of the lemon. By R. E. Smith. July, 1907.
191. California peach blight. By R. E. Smith. Sept., 1907.
192. Insects injurious to the vine in California. By H. J. Quayle. Oct., 1907.
193. The best wine grapes for California; pruning young vines; pruning the sultanina. By F. T. Bioletti. Nov., 1907.
194. Commercial fertilizers. By J. S. Burd. Dec., 1907.
195. The California grape root-worm. By H. J. Quayle. July, 1908.
196. Eucalyptus in California. By N. D. Ingham. July, 1908. See also 225.
197. Grape culture in California: Improved methods of wine making. By F. T. Bioletti. Yeasts from California grapes. By H. C. Holm. July, 1908.
198. The grape leaf-hopper. By H. J. Quayle. July, 1908.
199. Bovine tuberculosis. By A. R. Ward and C. M. Haring. Aug., 1908.
200. Gum disease of citrus trees in California. By R. E. Smith and O. Butler. Aug., 1908.
201. Commercial fertilizers. By J. S. Burd. June, 1908.
202. Commercial fertilizers. By J. S. Burd. Dec., 1908. [Pub. 1909.]
203. Report of the plant pathologist and superintendent of southern California stations, July, 1906, to June 30, 1909. By R. E. Smith. Nov., 1909.
204. The dairy cow's record and stable. By Leroy Anderson [and C. W. Rubel]. Dec., 1909.
205. Commercial fertilizers. By J. S. Burd. Dec., 1909.
206. Commercial fertilizers. By J. S. Burd. June, 1910.
207. The control of the Argentine ant. By C. W. Woodworth. Oct., 1910.
208. The late blight of celery. By S. S. Rogers. Jan., 1911.
209. The cream supply. By H. A. Hopper. Jan., 1911.
210. Imperial Valley settler's crop manual. By J. E. Coit and W. E. Packard. Jan., 1911.
211. How to increase the yield of wheat in California. By G. W. Shaw. Feb., 1911.
212. California white wheats. By G. W. Shaw and A. J. Gaumnitz. Apr., 1911.
213. The principles of wine making. By F. T. Bioletti. May, 1911.
214. Citrus fruit insects. By H. J. Quayle. May, 1911.
215. The house fly in its relation to public health. By W. B. Herms. May, 1911.
216. A progress report upon soil and climatic factors influencing the composition of wheat. By G. W. Shaw and E. H. Walters. June, 1911.



217. Honey plants of California. By M. C. Richter. June, 1911.  
 218. California plant diseases. By R. E. Smith and E. H. Smith. June, 1911.  
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13. The measurement and division of water. By L. G. Carpenter. Oct., 1890. Reprinted. July, 1891. See also 13 and 27.
14. Progress bulletin on sugar beets. By D. O'Brine. Jan., 1891.

<sup>2</sup> A summary of these investigations was first published in Jour. Indus. Engin. Chem., 7 (1915), No. 12, p. 1038-1041.

15. Two insect pests: The codling moth and the grapevine leaf hopper. By C. P. Gillette. Apr., 1891.
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157. Arsenical poisoning of fruit trees. By W. P. Headden. May, 1910.
158. A bacterial disease of alfalfa. By W. G. Sackett. April, 1910.
159. A new alfalfa disease: Stem blight. By W. G. Sackett. April, 1910. (An abbreviated edition of 158.)
160. Nitrates in the soil: An explanation of so-called "black alkali" or "brown spots." By W. P. Headden. May, 1910.

161. Cement and concrete fence posts. By H. M. Bainer and H. B. Bonebright. May, 1910. An abbreviated edition of 148.
162. Rabies. By G. H. Glover and B. F. Kaupp. July, 1910.
163. Farm butter making. By H. M. Bainer. July, 1910.
164. Poultry raising. By W. E. Vaplon. Aug., 1910.
165. Ration experiments with swine, 1906-1908. By W. L. Carlyle and G. E. Morton. Aug., 1910.
166. Information concerning the Colorado carriage horse breeding station. By J. O. Williams. Aug., 1910.
167. Life and care of farm machinery in Colorado. By H. M. Bainer and H. B. Bonebright. Sept., 1910.
168. The deterioration of manures under semiarid conditions. By W. P. Headden and Earl Douglass. Nov., 1910.
169. Some insects and mites attacking the peach in Colorado. By G. P. Weldon.—Two plant lice of the peach. By C. P. Gillette and G. P. Weldon. Nov., 1910.
170. Thinning of the winesap; winter and frost injuries of fruit trees. By R. S. Herrick. Nov., 1910.
171. The Colorado raspberry industry. By R. S. Herrick and E. R. Bennett. Nov., 1910.
172. Garden notes, 1910. By E. R. Bennett. Nov., 1910.
173. Notes on dry land orchard. By J. E. Payne. Nov., 1910.
174. Adobe as a building material for the plains. By J. W. Adams. Nov., 1910.
175. The potato industry of Colorado. By C. L. Fitch and E. R. Bennett.—Potato insects. By S. A. Johnson. Nov., 1910.
176. Productiveness and degeneracy of the Irish potato. By C. L. Fitch. Nov., 1910.
177. Hold-over blight in the pear. By W. G. Sackett. June, 1911.
178. The fixation of nitrogen in some Colorado soils. By W. P. Headden. June, 1911.
179. Bacteriological studies of the fixation of nitrogen in certain Colorado soils. By W. G. Sackett. June, 1911.
180. Seepage and return waters: Part I, General discussion and principles; Parts II and III, Detailed measurements. By L. G. Carpenter. 1911.
181. Alfalfa: The reaction of type to hardness. By P. K. Blinn. Dec., 1911.
182. Colorado climatology. By R. E. Trimble. April, 1912. Supplements 127. See also 245.
183. Deterioration in the quality of sugar beets due to nitrates formed in the soil. By W. P. Headden. May, 1912.
184. The ammonifying efficiency of certain Colorado soils. By W. G. Sackett. Algae in some Colorado soils. By W. W. Robbins. June, 1912.
185. Some poultry diseases. By B. F. Kaupp. Sept., 1912.
186. The fixation of nitrogen in Colorado soils: The distribution of nitrates and their relation to alkalis. By W. P. Headden. May, 1913.
187. Feeding experiments with lambs 1908-9, 1909-10, 1910-11. By G. E. Morton. June, 1913.
188. Ration experiments with swine 1908-1911. By G. E. Morton. June, 1913.
189. Cost of beef production under semiarid conditions. By G. E. Morton. June, 1913.
190. Variation studies in brome grass; a preliminary report. By Alvin Keyser. June, 1913.
191. Alfalfa seed production; a progress report. By P. K. Blinn. June, 1913.
192. Home-made cider vinegar. By W. G. Sackett. Nov., 1913.
193. The nitrifying efficiency of certain Colorado soils. By W. G. Sackett. Jan., 1914.
194. Frictional resistance in artificial waterways. By V. M. Cone, R. E. Trimble, and P. S. Jones. Jan., 1914.
195. Small fruits for Colorado. By E. P. Sandsten. May, 1914.
196. Some soil changes produced by microorganisms (Popular). By W. G. Sackett. June, 1914.
197. Hog cholera control. By G. H. Glover.—Necrotic stomatitis. By I. E. Newsom. May, 1914.
198. The onion in Colorado. By E. R. Bennett. June, 1914.
199. Vegetable growing in Colorado: hot beds and cold frames. By R. A. McGinty.—Common insects of the garden. By C. P. Gillette. Aug., 1914.
200. Silos and silage in Colorado. By H. E. Dvorachek. Aug., 1914.
201. Some Colorado mushrooms. By B. O. Longyear. Nov., 1914.
202. Testing and handling of milk and cream. By Roud McCann. Nov., 1914.
203. Farm costs on the Colorado Agricultural College farm. By Alvin Keyser. Dec., 1914.
204. Brisket disease (dropsy of high altitudes). By G. H. Glover and I. E. Newsom. Jan., 1915. See also 229.
205. Yellow berry in wheat, its cause and prevention. By W. P. Headden. Feb., 1915.
206. Spur blight of the red raspberry caused by *Sphaerella rubina*. By W. G. Sackett. May, 1915.
207. The Colorado statute inch and some miner's inch measuring devices. By V. M. Cone. May, 1915.
208. A study of Colorado wheat, Part I. By W. P. Headden. June, 1915.
209. Irrigated agriculture in the San Luis Valley. By V. M. Cone and Alvin Kezer. July, 1915.
210. Insects and insecticides, being a revised edition of Bulletin 114. By C. P. Gillette and G. M. List. Oct., 1915. A revision of 114.
211. Colorado plants injurious to livestock. By G. H. Glover and W. W. Robbins. Oct., 1915.
212. Fungous diseases of Colorado crop plants. By W. W. Robbins and O. A. Reinking. Oct., 1915.
213. Poultry raising in Colorado. By W. E. Vaplon. Oct., 1915.
214. Forage crops for the Colorado plains. By Alvin Kezer. 1915.
215. The Dethridge meter. By V. M. Cone. Nov., 1915.
216. Studies of health in potatoes. By C. L. Fitch. Nov., 1915.
217. A study of Colorado wheat, Part II. By W. P. Headden. Mar., 1916.
218. A bacterial stem blight of field and garden peas. By W. G. Sackett. Apr., 1916.
219. A study of Colorado wheat, Part III. By W. P. Headden. July, 1916.
220. Potato growing in Colorado. By E. P. Sandsten. Jan., 1917.
221. Hotbeds and cold frames. By T. F. Limbocker. Jan., 1917.
222. The foraging of strawberries. By Florence I. Kinnison. Feb., 1917.
223. A fruit survey of Mesa County. By E. P. Sandsten, T. F. Limbocker, and R. A. McGinty. Feb., 1917.
224. Native vegetation and climate of Colorado in their relation to agriculture. By W. W. Robbins. Feb., 1917.
225. A comparative bacteriological study of the water supply of the city and county of Denver, Colorado. By W. G. Sackett. Feb., 1917.
226. Beans in Colorado. By Alvin Kezer.—Diseases of beans. By W. G. Sackett. Mar., 1917. See 234.
227. Dry farming in Colorado. By Alvin Kezer. Apr., 1917.
228. Divisors (for the measurement of irrigation water). By V. M. Cone. Apr., 1917.
229. Brisket disease. By G. H. Glover and I. E. Newsom. May, 1917. A revision of 204.
230. The waters of the Rio Grande; a contribution to the hydrology of the San Luis Valley, Colorado. By W. P. Headden. July, 1917.
231. "Black alkali" in the San Luis Valley. By W. P. Headden. Oct., 1917.
232. Harvesting and storing vegetables for home use. By J. J. Gardner. June, 1917.
233. Grasshopper control. By C. R. Jones. June, 1917.

234. Beans in Colorado. By Alvin Kezer.—Diseases of beans. By W. G. Sackett. Mar., 1918. A revised edition of 228.
235. Reclaiming nitre soil in the Grand Valley. By E. P. Sandsten. Aug., 1917.
236. The dandelion in Colorado. By B. O. Longyear. Jan., 1918.
237. The properties of Colorado wheat. By W. P. Headden. Mar., 1918.
238. Cleaned, treated, and tested seed for Colorado. By W. W. Robbins, H. E. Vasey, and G. E. Egginton. Jan., 1918.
239. Alkalis in Colorado (including nitrates). By W. P. Headden. May, 1918.
240. Irrigation by means of underground porous pipe. By E. B. House. June, 1918.
241. The home vegetable garden. By R. A. McGinty. Feb., 1918.
242. Millet smuts and their control. By H. E. Vasey. Feb., 1918.
243. Potato culture in Colorado. By E. P. Sandsten. Mar., 1918.
244. A study of Colorado wheat, Part IV. By W. P. Headden. June, 1918.
245. Colorado climatology. By R. E. Trimble. June, 1918. Supplements 127 and 182.
246. A new poisonous plant, the whorled milk weed (*Asclepias verticillata*). By G. H. Glover, I. E. Newsom, and W. W. Robbins. July, 1918.
247. A study of Colorado wheat, a résumé of Bulletins 205, 208, 217, 219, 237, and 244. By W. P. Headden. July, 1918.
248. Alfalfa fodder in Colorado. By W. W. Robbins and G. E. Egginton. Nov., 1918.
249. Mendelian inheritance in wheat and barley crosses with probable error studies on class frequencies. By Alvin Kezer and Breeze Boyack. Oct., 1918.
250. Orchard management. By E. P. Sandsten. Apr., 1919.
251. The identification and control of Colorado weeds. By W. W. Robbins and Breeze Boyack. July, 1919.
252. Honey as a carrier of intestinal diseases. By W. G. Sackett. Dec., 1919.
253. Irrigation water as a factor in the dissemination of weed seeds. By G. E. Egginton and W. W. Robbins. June, 1920.
254. Orchard survey of Fremont County. By E. P. Sandsten and C. M. Tompkins. Jan., 1920.
255. Whorled milkweed, the worst stock-poisoning plant in Colorado. By W. L. May. Jan., 1920.
256. Horticulture at high altitudes. By R. A. McGinty. Aug., 1920.
257. Factors that affect alfalfa seed yields. By P. K. Blinn. June, 1920.
258. The fixation of nitrogen in Colorado soils. By W. P. Headden. Feb., 1921.
259. Colorado plant diseases. By J. G. Leach. Apr., 1921.
260. Colorado weed seeds. By C. E. Egginton. Jan., 1921.
261. Report of potato investigations. By C. F. Clark. Jan., 1921.
262. Sod disease of chickens (vesicular dermatitis). By I. E. Newsom and W. H. Feldman. Oct., 1920.
263. General index to Colorado experiment station publications, Bulletins 1-249, Press Bulletins 1-58, Reports 1-31. By Arlene Dilts. Feb., 1921.
264. Perennial peppergrass, a noxious weed in Colorado. By A. K. Peitersen and R. T. Burdick. Oct., 1920.

## INFORMATION BULLETIN.

Preliminary report on steer feeding experiments, 1914-15 and 1916-17. By G. E. Morton and T. E. Leiper. Jan., 1918.

## SEED LABORATORY BULLETINS.

- V, I, No. 1. The Colorado seed act. By W. W. Robbins and G. E. Egginton. Sept., 1917
- V, I, No. 2. First annual report. By W. W. Robbins. Dec., 1917.
- V, I, No. 3. Second annual report, [December 1, 1917, to November 30, 1918]. By W. W. Robbins. Dec., 1918.
- V, I, No. 4. Colorado pure seed law. By W. W. Robbins. Aug., 1919.
- V, I, Nos. 5-6, listed in the third annual report of the Colorado Seed Laboratory (v. 2, No. 2) were not issued.
- V, II, No. 1. Not issued.
- V, II, No. 2. Third annual report [December 1, 1918, to November 30, 1919]. By W. W. Robbins and G. E. Egginton. Dec., 1919.

## BULLETINS, TECHNICAL SERIES.

Bulletins 31, 37, 43, 44, 56, and 94 of the regular series are also designated Technical Bulletins Nos. 1, 2, 3, 4, 5, and 6, respectively.

## INDEXES.

Index to Bulletins 1-17 (See Bulletin 18).

General index to Colorado Experimental Station publications, Bulletins 1-58, Press bulletins 1-58, Reports 1-31. By Arlene Dilts. Feb., 1921. (Colo. Agr. Expt. Sta. Bul. 263).

## CONNECTICUT.

The Connecticut Agricultural Experiment Station, New Haven.<sup>3</sup>

## BULLETINS.

With the exception of Bulletins 4, 19, 20, the first of 67 numbers are mimeographed or printed slips for the use of the agricultural press.

- [1.] [Analysis of "composition for grass."] By S. W. Johnson. Aug. 18, 1877.
- [2.] [Analysis of "composition for vegetables."] By S. W. Johnson. Aug. 28, 1877.
- [3.] [Analysis of soluble Pacific guano.] By S. W. Johnson. Sept. 8, 1877.
- [4.] [Fertilizers: Analyses, explanations, work in progress.] Oct., 1877.
- [4.] Fertilizer analysis. By S. W. Johnson. Mar. 11, 1878.
5. Fertilizer analyses. By S. W. Johnson. Mar. 19, 1878.
6. Fertilizer analyses. By S. W. Johnson. Mar. 29, 1878.
7. Fertilizer analyses. By S. W. Johnson. Apr. 9, 1878.
8. Fertilizer analyses. By S. W. Johnson. Apr. 24, 1878.
9. Analyses of leached ashes and egg food. By S. W. Johnson. Apr. 30, 1878.
10. Fertilizer analyses. By S. W. Johnson. May 7, 1878.
11. [Fertilizer analyses.] By S. W. Johnson. May 11, 1878.
12. Fertilizer analyses. By S. W. Johnson. Mar. 18, 1878.

<sup>3</sup> For accounts of work done at Middletown prior to the establishment of the station at New Haven, see the following reports: Preliminary report, May 1, 1876.—First annual report for 1876.—Report of work, 1877-78, with an account of field experiments with fertilizers.

13. Fertilizer analyses. By S. W. Johnson. May 25, 1878.
14. Fertilizer analyses. By S. W. Johnson. June 1, 1878.
15. Fertilizer analyses. By S. W. Johnson. June 8, 1878.
16. Fertilizer analyses. By S. W. Johnson. June 15, 1878.
17. Fertilizer analyses. By S. W. Johnson. June 22, 1878.
18. Fertilizer analyses. By S. W. Johnson. July 13, 1878.
19. Fertilizer analyses. By S. W. Johnson. Sept. 18, 1878.
20. Fertilizer analyses. By S. W. Johnson. Nov. 12, 1878.
21. Fertilizer analyses. By S. W. Johnson. Mar. 29, 1879.
22. Fertilizer analyses. By S. W. Johnson. [Apr. 5, 1879].
23. Analyses of hay. By S. W. Johnson. Mar. 11, 1879.
24. Fertilizer analyses. By S. W. Johnson. Apr. 25, 1879.
25. Fertilizer analyses. By S. W. Johnson. May 2, 1879.
26. Fertilizer analyses. By S. W. Johnson. May 16, 1879.
27. Fertilizer analyses. By S. W. Johnson. May 23, 1879.
28. Fertilizer analyses. By S. W. Johnson. June 6, 1879.
29. Fertilizer analyses. By S. W. Johnson. June 13, 1879.
30. Fertilizer analyses. By S. W. Johnson. June 20, 1879.
31. Fertilizer analyses. By S. W. Johnson. July 4, 1879.
32. Fertilizer analyses. By S. W. Johnson. July 18, 1879.
33. Fertilizer analyses. By S. W. Johnson. Oct. 7, 1879.
34. Analyses of hay. By S. W. Johnson. Oct. 17, 1879.
35. Analyses of maize kernel. By S. W. Johnson. Nov. 8, 1879.
36. Shell marl, marine mud, and seaweed, oyster shell lime. By [S. W. Johnson.] Feb. 7, 1880.
37. Fresh water sediments; peat or swamp muck. By S. W. Johnson. Feb. 14, 1880.
38. Fertilizer analyses. By S. W. Johnson. Apr. 3, 1880.
39. Fertilizer analyses. By S. W. Johnson. Apr. 10, 1880.
40. Fertilizer analyses. By S. W. Johnson. Apr. 24, 1880.
41. Fertilizer analyses. By S. W. Johnson. May 1, 1880.
42. Fertilizer analyses. By S. W. Johnson. May 8, 1880.
43. Fertilizer analyses. By S. W. Johnson. May 29, 1880.
44. [Fertilizer analyses.] By S. W. Johnson. June 12, 1880.
45. Fertilizer analyses. By S. W. Johnson. June 18, 1880.
46. Fertilizer analyses. By S. W. Johnson. July 15, 1880.
47. Fertilizer analyses. By S. W. Johnson. Sept. 21, 1880.
48. Forrester's fertilizers. By S. W. Johnson. Oct. 23, 1880.
49. Analyses of swamp muck. By S. W. Johnson. Oct. 30, 1880.
50. Fertilizer analyses. By S. W. Johnson. Dec. 18, 1880.
51. Fertilizer analyses; sorghum seed; kiln-dried brewer's grains; Paris green on cornstalks. By S. W. Johnson. Jan. 27, 1881.
52. Cost of active ingredients of fertilizers during 1880 and trade value adopted by the station for 1881; fertilizer analyses. By S. W. Johnson. Feb. 2, 1881.
53. The bird guano and fertilizer; apple pomace as a fertilizer; apple pomace as cattle food. By S. W. Johnson. Feb. 16, 1881.
53. [i. e. 54]. Ashes from factories in Canada; Quinipiac coarse bone. By S. W. Johnson. Mar. 30, 1881.
55. Night soil; maize ensilage. By S. W. Johnson. Apr. 5, 1881.
56. [Fertilizer analyses.] By S. W. Johnson. Apr. 15, 1881.
57. [Fertilizer analyses.] By S. W. Johnson. Apr. 21, 1881.
58. [Fertilizer analyses]; trade values for 1881. By S. W. Johnson. Apr. 28, 1881.
59. Fertilizer analyses. By S. W. Johnson. May 5, 1881.
60. An act concerning commercial fertilizers; fertilizer analyses. May 12, 1881.
61. Special manures and superphosphates. By S. W. Johnson. May 26, 1881.
62. [Fertilizer analyses.] By S. W. Johnson. June 3, 1881.
63. [Fertilizer analyses.] By S. W. Johnson. June 9, 1881.
64. [Fertilizer analyses.] By S. W. Johnson. June 17, 1881.
65. [Fertilizer analyses.] By S. W. Johnson. June 23, 1881.
66. [Fertilizer analyses.] By S. W. Johnson. Sept. 1, 1881.
67. [Fertilizer analyses.] By S. W. Johnson. Oct. 15, 1881.
68. Trade value for 1882; fertilizer analyses; fodders. By S. W. Johnson. Mar. 8, 1882.
69. Fertilizer analyses. By S. W. Johnson. May 23, 1882.
70. Fertilizer analyses. June 30, 1882.
71. Fertilizer analyses. By S. W. Johnson. July 29, 1882.
72. Fertilizer law; location of the experiment station; fertilizer analyses. By S. W. Johnson. Aug. 25, 1882.
73. An act concerning commercial fertilizers; observance of the fertilizer law; fertilizer analyses; trade values for 1883. Apr., 1883.
74. [Analyses of fertilizers.] By S. W. Johnson. May 1, 1883.
75. Observance of the fertilizer law; fertilizer analyses. June 11, 1883.
76. Observance of the fertilizer law; fertilizer analyses. July 30, 1883.
77. Trade values of fertilizing ingredients in raw material and chemicals for 1884; fertilizer analyses; analyses of the ash of healthy and diseased peach wood. By S. W. Johnson. Apr., 1884.
78. Explanations concerning the analysis of fertilizers and the valuation of their active ingredients; fertilizer analyses; the Connecticut law. By S. W. Johnson. May, 1884.
79. Observance of the fertilizer law; fertilizer analyses. July, 1884.
80. Observance of the fertilizer law; fertilizer analyses; trade values. By S. W. Johnson. Sept., 1884.
81. To manufacturers and dealers in commercial fertilizers in Connecticut; fertilizer analyses. By S. W. Johnson. Oct., 1884.
82. [Fertilizers.] By S. W. Johnson. Mar., 1885.
83. [Fertilizers.] Apr., 1885.
84. [Fertilizers.] June, 1885.
85. Fertilizer analyses. Oct., 1885.
86. To manufacturers and dealers in commercial fertilizers in Connecticut; fertilizer analyses; fodder analyses. Jan., 1886.
87. Valuation of fertilizers; fertilizer analyses; analysis of Florida oranges; fodder analyses. Mar., 1886.
88. Gratuitous analysis of commercial fertilizers; instructions for sampling commercial fertilizers; observance of the fertilizer law; trade values; fertilizer analyses. July, 1886.
89. Analyses of superphosphates and special manures. Oct., 1886.
90. Valuation of fertilizers; fertilizer analyses. By S. W. Johnson. Mar., 1887.
91. Notice [concerning samples of grasses]; fertilizer analyses. By S. W. Johnson. Apr., 1887.
92. [Fertilizers: Observance of the law; analyses.] Sept., 1887.

93. [List of grasses and forage plants in the station garden.] Nov., 1887.
94. [Fertilizers: Trade values and analyses.] Apr., 1888.
95. [Fertilizers: Home mixtures, analyses, observance of the law.] June, 1888.
96. On the valuation of feeding stuffs; analyses of feeding stuffs; the average composition of feeds for dairy stock. Jan., 1889.
97. Fungous diseases of plants; fertilizers. Apr., 1889.
98. Home-mixed fertilizers. June, 1889.
99. Fertilizer analyses. June, 1889.
100. Analysis of sylvanite; analyses of unleached wood ashes; analyses and valuations of commercial mixed fertilizers. Sept., 1889.
101. [Fertilizer analyses.] Jan., 1890.
102. Fungicides. By Roland Thaxter. Mar., 1890.
103. Fertilizers. May, 1890.
104. Fertilizers. Oct., 1890.
105. Notice as to supply of station reports; corrections.—The potato scab. By Roland Thaxter.—The proteids of the oat kernel. By T. B. Osborne.—Milk testing. Dec., 1890.
106. The Babcock method of determining fat in milk and cream for the use of creameries; analyses of butter from exhibit at the dairymen's meeting; fertilizers. Mar., 1891. See also 117.
107. The Connecticut species of *Gymnosporangium* (cedar apples). By Roland Thaxter. Apr., 1891.
108. Examination of the seed of orchard grass; ash analysis of white globe onions; on the determination of fat in cream by the Babcock method. May, 1891.
109. Fertilizers. Aug., 1891.
110. Notice as to supply of station reports; Canada ashes; a request for samples of Indian corn; correction. By S. W. Johnson. Dec., 1891.
111. Notice as to bulletins [and] reports.—Common fungous diseases and methods of treatment. By W. C. Sturgis. Mar., 1892. See also 115.
112. On the Gunning-Kjeldahl method and a modification applicable in the presence of nitrates. By A. L. Winton. June, 1892.
113. Notice as to bulletins [and] reports, fertilizers. Sept., 1892.
114. Notice as to bulletins, fertilizers. Dec., 1892.
115. Common fungous diseases and their treatment; a provisional spraying calendar. By W. C. Sturgis. Mar., 1893. A revision of 111. Revised May, 1893.
116. The Connecticut fertilizer law; acts concerning Connecticut fertilizers; cottonseed meal as a fertilizer and feed. Oct., 1893.
117. The Babcock method of determining fat in milk and milk products. Jan., 1894. Supersedes 106.
118. A provisional bibliography of the more important works published by the U. S. Department of Agriculture and the agricultural experiment stations of the United States from 1886 to 1893, inclusive, on fungous and bacterial diseases of economic plants. By W. C. Sturgis. Mar., 1894.
119. The Babcock test as a basis for payment in cream-gathering creameries. By A. L. Winton and A. W. Ogden. May, 1894.
120. Analyses of fertilizers; trade values of fertilizer ingredients for 1895; poultry foods. By E. H. Jenkins. Apr., 1895.
121. The elm leaf beetle.—The San José scale. By W. C. Sturgis and W. E. Britton.—Trade values of fertilizer ingredients in raw materials and chemicals for 1895, correction. July, 1895. Revised July, 1895.
122. Cost of nitrogen, phosphoric acid, and potash in Connecticut, spring months of 1896.—The proper use of tables of analyses of fertilizers and fertilizer chemicals. By E. H. Jenkins. May, 1896.
123. Examination of food products sold in Connecticut. By A. W. Ogden, A. L. Winton, and E. H. Jenkins. July, 1896.
124. The cost of plant food in Connecticut, spring months of 1897. June, 1897.
125. Preparation and application of fungicides. By W. C. Sturgis. Apr., 1898.
126. Insecticides, their preparation and use. By W. E. Britton. May, 1898.
127. The cost of plant food in Connecticut, spring months of 1898. May, 1898.
128. Commercial feeding stuffs in the Connecticut market. Apr., 1899.
129. Inspection and care of nursery stock. By W. E. Britton. May, 1899.
130. Commercial feeding stuffs in the Connecticut market. [By E. H. Jenkins.] Jan., 1900.
131. The protection of shade trees in towns and cities. [By E. H. Jenkins and others.] Nov., 1900.
132. Condimental and medicinal cattle and poultry foods. Feb., 1901.
133. Commercial feeding stuffs in the Connecticut market. [By E. H. Jenkins.] Feb., 1901.
134. The new law concerning insect pests. By W. E. Britton. Aug., 1901.
135. The San José scale insect, its appearance and spread in Connecticut. By W. E. Britton. Dec., 1901. See also 165.
136. Preliminary experiments in spraying to kill the San José scale insect, season of 1901. By W. E. Britton. Feb., 1902.
137. The growing of tobacco under shade in Connecticut. By E. H. Jenkins. Feb., 1902.
138. Commercial feeding stuffs in the Connecticut market. [By E. H. Jenkins.] Apr., 1902.
139. The apple-tree tent caterpillar, *Clisiocampa americana*, Harris. By W. E. Britton. July, 1902. See also 177.
140. The white fly or plant-house aleyrod, *Aleyrodēs vaporariorum* Westw? By W. E. Britton. Sept., 1902.
141. Commercial feeding stuffs in the Connecticut market. [By E. H. Jenkins.] Jan., 1903.
142. Spray calendar. By W. E. Britton and G. P. Clinton. 1903.
143. Two common scale insects of the orchard: The scurfy bark louse *Chionaspis furfurus*, Fitch; the oyster shell bark louse *Mytilaspis pomorum*, Bouché. By W. E. Britton. May, 1903.
144. Fighting the San José scale insect in 1903. By W. E. Britton and B. H. Walden. Oct., 1903.
145. Commercial feeding stuffs in the Connecticut market. [By E. H. Jenkins.] Jan., 1904.
146. San José scale-insect experiments in 1904. By W. E. Britton and B. H. Walden. Oct., 1904.
147. Commercial feeding stuffs now in the Connecticut market. [By E. H. Jenkins.] Jan., 1905.
148. The preparation of tobacco seed. By A. D. Shamel. Mar., 1905.
149. A new and valuable cover crop for tobacco fields. By A. D. Shamel. June, 1905.
150. The selection of tobacco seed plants. By A. D. Shamel. June, 1905.
151. The chief injurious scale insects of Connecticut. By W. E. Britton. June, 1905.
152. The improvement of corn in Connecticut. By E. M. East. Jan., 1906.
153. The gypsy moth and the brown-tail moth. By W. E. Britton. Mar., 1906.
154. Chestnut in Connecticut and the improvement of the wood lot. By A. F. Hawes. Sept., 1906.
155. The elm leaf beetle. By W. E. Britton. May., 1907.
156. Cotton seed meal as a fertilizer. By E. H. Jenkins and J. P. Street. June, 1907.



157. Lead arsenate and Paris green: I, Their chemical composition. By J. P. Street.—II, Directions for their use as insecticides. By W. E. Britton. Sept., 1907.
158. The relation of certain biological principles to plant breeding. By E. M. East. Nov., 1907.
159. Spray calendar. Jan., 1908.
160. Clover seed in the Connecticut market. By E. H. Jenkins and Mary H. Jagger. June, 1908.
161. Feeds, seeds, and weeds. By E. H. Jenkins. Jan., 1909.
162. Forest survey of Litchfield and New Haven Counties, Connecticut. By A. F. Hawes and R. C. Hawley. Jan., 1909.
163. Agricultural lime: Its sources, composition, and prices, with notes on its action in the soil. By E. H. Jenkins and E. M. East. Feb., 1909.
164. Garden and field seeds sold in Connecticut in 1908-9. By E. H. Jenkins and Mary H. Jagger. Oct., 1909.
165. The San José scale and methods of controlling it. By W. E. Britton. Nov., 1909. A revision of 135.
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3. Roots of plants as manure.—Meteorological observations. By E. A. Bailey. Feb., 1889.
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5. Atmospheric nitrogen as plant food. [By C. D. Woods.]—Meteorological observations. By E. A. Bailey. Oct., 1889.
6. Grass and forage garden; grasses and legumes. By C. D. Woods and C. S. Phelps. Aug., 1890.
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36. Poultry suggestions for the amateur. By C. K. Graham. June, 1905.
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45. The apple-leaf miner. By C. D. Jarvis. Dec., 1906.
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49. Petroleum emulsion for the San José scale. By C. D. Jarvis. Nov., 1907. See 54.
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## The Delaware College Agricultural Experiment Station, Newark.

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3. The department of botany and plant pathology. By F. D. Chester. Dec., 1888.
4. Injurious insects, their identification and extermination. By M. H. Beckwith. May, 1889.
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7. Stock feeding. By C. L. Penny and A. T. Neale. Dec., 1889.
8. The possibilities of developing a domestic sugar industry; the value of sulphide of potassium as a remedy against pear scab; London purple as a remedy against the codling moth. By M. H. Beckwith. Mar., 1890.
9. Creamery studies of methods and machinery. By A. T. Neale.—Creameries as a business. By C. L. Penny. 1890.
10. [Introduction.] By A. T. Neale.—Diseases of the vine controlled by several different salts of copper. By F. D. Chester. Oct., 1890.
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13. [Introduction.] By A. T. Neale.—The leaf blight of the pear and the quince. By F. D. Chester. July, 1891.

14. Field tests upon Indian corn. By A. T. Neale.—Notes on a corn crambid. M. H. Beckwith. Dec., 1891.
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16. Scarlet clover. By A. T. Neale. Mar., 1892.
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18. Strawberries: I, Test of varieties; II, a strawberry weevil. By M. H. Beckwith. Sept., 1892.
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23. Texas fever. By A. T. Neale. Dec., 1893.
24. Strawberries: Test of varieties. By M. H. Beckwith. July, 1894.
25. The San José scale in Delaware. By M. H. Beckwith. May, 1895.
26. Abstract from annual report 1894. Mar., 1895.
27. Tests of sorghum varieties. By C. L. Penny. June, 1895.
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29. Experiments in the treatment of peach rot and of apple scab. By F. D. Chester. Oct., 1895.
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31. Milk sampling. By C. L. Penny. 1896.
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33. The increase of the San José scale in Delaware during 1896. By G. H. Powell. 1896.
34. The treatment of plant diseases in 1896. F. D. Chester. Jan., 1897.
35. The cherry in Delaware. By G. H. Powell. 1897.
36. Potash: Its commercial relations; its agricultural relations; chemical method for its accurate estimation in soil. By C. L. Penny. 1897.
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38. Some principles in Delaware apple culture. By G. H. Powell. 1898.
39. Sorghum: Its development as a commercial source of sugar. By C. L. Penny. 1898.
40. Soil bacteria in their relation to agriculture, Part I. By F. D. Chester. 1898.
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61. Orchard cover crops in Delaware. By C. P. Close. June, 1903.
62. Pruning the peach. By C. P. Close. Feb., 1904.
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79. Home-made miscible oils. By C. L. Penny.—Orchard tests of miscible oils. By C. O. Houghton. Aug., 1907.
80. Annual report of the director for the year ending June 30, 1907. [By Harry Hayward.] Jan., 1908.
81. Report of the agronomist for the season of 1907. [By A. E. Grantham.] Mar., 1908.
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85. Spraying for the brown rot of the peach, 1908. By C. A. McCue. May, 1909.
86. Crimson clover: Its rate of gaining nitrogen. By C. L. Penny and Margaret B. MacDonald. Jan. 1, 1910.

87. Two important leaf miners. By C. O. Houghton. Mar. 1, 1910.
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89. Crimson clover culture. By A. E. Grantham. June 15, 1910.
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101. Tomatoes for the canning factory. By C. A. McCue and W. C. Pelton. May 20, 1913.
102. Fruit juices. By Firman Thompson and A. C. Whittier. May 1, 1913.
103. Annual report of the director for the fiscal year ending June 30, 1913. By Harry Hayward. May 15, 1914.
104. Lime and its uses on land: Part I, Forms of lime. By Firman Thompson.—Part II, The use of lime. By A. E. Grantham. June, 1914.
105. The composition of lime-sulfur solutions. By Firman Thompson and A. C. Whittier. June, 1914.
106. The diseases of the sweet pea. By J. J. Taubenhaus. Nov., 1914.
107. Annual report of the director for the fiscal year ending June 30, 1914. By Harry Hayward. Jan., 1915.
108. Some new bacterial diseases of legumes and the relationship of the organisms causing the same. By T. F. Manns. Apr., 1915.
109. The diseases of the sweet potato and their control. By J. J. Taubenhaus and T. F. Manns. May, 1915.
110. Alfalfa in Delaware. By A. E. Grantham. June, 1915.
111. Annual report of the director for the fiscal year ending June 30, 1915. By Harry Hayward. Feb. 1, 1916.
112. A study of soy bean hay. By A. C. Whittier. May, 1916.
113. Financial statement of the experiment station peach orchard. By C. A. McCue. June, 1916.
114. The sweet potato "soil rot" or "pox," a slime mold disease. By J. A. Elliott. Nov., 1916.
115. A preliminary report on muck humus as a fertilizer and carrier of beneficial soil bacteria. By T. F. Manns and J. N. Goheen. Dec., 1916.
116. Annual report of the director for the fiscal year ending June 30, 1916. [By Harry Hayward.] Feb., 1917.
117. The tillering of winter wheat. By A. E. Grantham. Mar., 1917.
118. The relation of size of dairy to economy of milk production. By J. A. Hopkins, jr. Jan., 1918.
119. Annual report of the director for the fiscal year ending June 30, 1917. By Harry Hayward. Feb. 1, 1918.
120. Cover crops in the peach orchard. By C. A. McCue. Aug. 1, 1918.
121. Wheat investigations: Varieties. By A. E. Grantham. May 1, 1918.
122. Annual report of the director for the fiscal year ending June 30, 1918. [By Harry Hayward.] Nov. 1, 1918.
123. Inbreeding animals: I, Experimental evidence; II, Experimental results. By F. A. Hays. Aug. 1, 1919.
124. Swine production in Delaware. By F. A. Hays. Sept. 1, 1919.
125. Annual report of the director for the fiscal year ending June 30, 1919. [By Harry Hayward.] Dec. 1, 1919.
126. Annual report of the director for the fiscal year ending June 30, 1920. By C. A. McCue. Dec. 1, 1920.

## SPECIAL BULLETINS.

- A. Fungicides. By F. D. Chester. Mar., 1890.  
 B. Spray calendar. Apr., 1895.

## FLORIDA.

## Agricultural Experiment Station of Florida, Gainesville.

## BULLETINS.

1. [Report of experiments made by the agricultural section, gardening section, horticultural section. By J. N. Whitner and J. Kost.] Apr., 1888.
2. [Report of experiments made by the several sections]. May—June, 1888.
3. Experiments with fertilizers; grasses; corn. Sept., 1888.
4. Peach growing in Florida. By J. C. Neal.—Annual report, 1888. By J. P. DePass. Jan., 1889.
5. Analysis of fertilizers. By J. M. Pickell and J. J. Earle. Apr., 1889.
6. Introduction. By J. P. DePass.—*Trifolium incarnatum*; Texas blue grass (*Poa arachnifera*). By J. C. Neal.—Department of chemistry. By J. M. Pickell and J. J. Earle. July, 1889.
7. Corn experiment; cucumbers; constituents of muck. By J. M. Pickell.—General characteristics of muck. By J. J. Earle.—Muck composting; compost making. By J. C. Neal. Oct., 1889.
8. Cotton experiment with long or black seed cotton; weeds of Florida. By J. C. Neal.—Annual report, 1889. By J. P. DePass. Jan., 1890.
9. Entomological notes. By J. C. Neal. Apr., 1890.
10. Annual report of the director, 1890.—Phosphate. By J. M. Pickell. July, 1890.
11. Experiments in corn and Irish potatoes; analysis of some Florida weeds and grasses. By J. M. Pickell. Oct., 1890.
12. Tobacco. By H. J. Fenton.—Long or black seed cotton; foreign cotton; rice; sorghum. By J. P. DePass.—Ashes as a fertilizer. By J. M. Pickell.—Ash of pine straw. By J. J. Earle and J. P. DePass. Jan., 1891.
13. General information. By J. P. DePass.—Irish potatoes; rye.—Soft marl phosphate as fertilizer; comparative value of raw finely powdered phosphate and of superphosphate as a fertilizer; a superphosphate from a low grade rock containing much alumina; muck. By J. M. Pickell and J. J. Earle. Apr., 1891.
14. Annual report, 1891. By J. P. DePass. July, 1891.

15. Tobacco and its cultivation. By J. P. DePass. Oct., 1891.
16. Corn, hay, weevil, rice, cane, Texas blue grass, and cotton. By J. P. DePass. Jan., 1892.
17. Analyses of the orange. By J. M. Pickell and J. J. Earle.—The horn fly. By P. H. Rolfs.—Questions concerning stock diseases. [Apr.], 1892.
18. Grasses; forage plants; tomato blight. By P. H. Rolfs. [July], 1892.
19. Tobacco. By J. P. DePass. Oct., 1892.
20. Soils and fertilizers. By A. A. Persons. Sept., 1893.
21. The tomato and some of its diseases. By P. H. Rolfs. Oct., 1893. See 47.
22. Fertilizers: How to make and how to use them. By A. A. Persons. Nov., 1893.
23. Insecticides and fungicides. By P. H. Rolfs. Dec., 1893.
24. Annual report, 1893. By Oscar Clute. Jan., 1894.
25. Leeches or leeching. By A. W. Bitting. Sept., 1894.
26. Big head. By A. W. Bitting. Oct., 1894.
27. Notes on experiments with the pineapple. By L. C. Washburn. Nov., 1894.
28. Liver fluke; southern cattle fever. By A. W. Bitting. Dec., 1894.
29. The San José scale. By P. H. Rolfs. Aug., 1895.
30. The culture of tobacco. By F. B. Moodie. Nov., 1895. See 38.
31. Some market vegetables for Florida. By P. H. Rolfs. Dec., 1895.
32. Cotton, its cultivation and fertilization. By A. A. Persons. Jan., 1896.
33. Present condition and treatment of orange groves. By M. S. Moreman. Feb., 1896.
34. Insect enemies of truck and garden crops. By A. L. Quaintance. Mar., 1896. See 134.
35. Cassava, the velvet bean, prickly comfrey, taro, Chinese yam, cañaire, alfalfa, flat pea, sachaline. By Oscar Clute. Apr., 1896.
36. Insects injurious to stored grain and cereal products. By A. L. Quaintance. Oct., 1896.
37. The pineapple at Myers. By Oscar Clute and W. A. Marsh. Nov., 1896.
38. Tobacco in Florida. By F. B. Moodie. Jan., 1897. A revision of 30, with additions.
39. Strawberry culture for the market and the home. By S. Powers [and C. H. Ward]. July, 1897.
40. The fall army worm; southern grass worm (*Laphygma frugiperda* Smith and Abbott). By A. L. Quaintance. July, 1897.
41. A fungus disease of the San José scale (*Sphaerostilbe coccophila* Tul.). By P. H. Rolfs. Aug., 1897.
42. Some strawberry insects. By A. L. Quaintance. Aug., 1897.
43. A chemical study of some typical soils of the Florida peninsula. By A. A. Persons. Sept., 1897.
44. Cane; sirup; sugar. By H. E. Stockbridge. Jan., 1898. See 118.
45. Three injurious insects: Bean leaf roller, corn delphax, canna leafroller. By A. L. Quaintance. Mar., 1898.
46. The strawberry thrips and the onion thrips. By A. L. Quaintance. July, 1898.
47. Diseases of the tomato. By P. H. Rolfs. Sept., 1898. See 91.
48. A preliminary report upon the insect enemies of tobacco in Florida. By A. L. Quaintance. Oct., 1898.
49. Cassava as a money crop. By H. E. Stockbridge. Mar., 1899.
50. Pineapple fertilizers. By P. H. Rolfs. May, 1899.
51. Some common Florida scales. By H. A. Gossard. Jan., 1900.
52. Baking powders. By H. K. Miller. Feb., 1900.
53. Some citrus troubles. By H. H. Hume. Mar., 1900.
54. Pecan culture. By H. H. Hume. Aug., 1900.
55. Feeding with Florida feed stuffs. By H. E. Stockbridge. Sept., 1900.
56. The cottony cushion scale. By H. A. Gossard. May, 1901.
57. Top working pecans. By H. H. Hume. June, 1901.
58. Pomelos. By H. H. Hume. June, 1901.
59. Cauliflower. By H. H. Hume. Oct., 1901.
60. Velvet bean. By H. K. Miller. Jan., 1902. See 102.
61. Two peach scales. By H. A. Gossard. July, 1902.
62. The Peen-to peach group. By H. H. Hume. July, 1902.
63. Diagrams for packing citrus fruits. By H. H. Hume. Sept., 1902.
64. Texas cattle fever and salt-sick. By C. F. Dawson. Oct., 1902.
65. The kumquats. By H. H. Hume. Dec., 1902.
66. The mandarin orange group. By H. H. Hume. Feb., 1903.
67. White fly (*Aleyrodes citri*). By H. A. Gossard. June, 1903.
68. Pineapple culture: I, Soils. By H. K. Miller and H. H. Hume. June, 1903.
69. Cultivation of citrus groves. By H. H. Hume. Jan., 1904.
70. Pineapple culture: II, Varieties. By H. H. Hume and H. K. Miller. Feb., 1904.
71. Japanese persimmons. By H. H. Hume and F. C. Reimer. Mar., 1904.
72. Feeding horses and mules on home-grown feed stuffs. By C. M. Conner. June, 1904.
73. The honey peach group. By F. C. Reimer. July, 1904.
74. Anthracnose of the pomelo. By H. H. Hume. Aug., 1904.
75. Potato diseases. By H. H. Hume. Aug., 1904.
76. Insecticides. By H. A. Gossard.—Fungous diseases and their control. By H. H. Hume. Nov., 1904.
77. Equine glands and its eradication. By C. F. Dawson. Feb., 1905.
78. Forage crops; the silo. By C. M. Conner. Mar., 1905.
79. Insects of the pecan. By H. A. Gossard. Apr., 1905. See 147.
80. The composition of some of the concentrated feeding stuffs on sale in Florida. By A. W. Blair. Apr., 1905.
81. Fertilizer suggestions. By E. R. Flint. Aug., 1905.
82. A preliminary report on growing Irish potatoes. By C. M. Conner. Dec., 1905.
83. Pineapple culture: III, Fertilizer experiments. By H. K. Miller and A. W. Blair. Feb., 1906.
84. Pineapple culture: IV, Handling the crop. By H. H. Hume. Mar., 1906.
85. Second report on pecan culture. By H. H. Hume. Mar., 1906.
86. Salt-sick (bovine uncinariasis). By C. F. Dawson. Sept., 1906.
87. Soil studies: I, Preliminary report. By A. W. Blair. Dec., 1906.
88. White fly conditions in 1906: The use of the fungi. By E. W. Berger. Jan., 1907.
89. Occurrence and use of artesian and other underground water. By E. H. Sellards. Mar., 1907.
90. Pig feeding with cassava and sweet potatoes. By C. M. Conner. Sept., 1907.
91. Tomato diseases. By P. H. Rolfs. Dec., 1907. A revision of 21 and 47. See 146.
92. Sorghum for silage and forage. By J. M. Scott. Mar., 1908.
93. Soil studies: II, Acid soils. By A. W. Blair and E. J. Macey. May, 1908.
94. Fungus diseases of scale insects and white fly. By P. H. Rolfs and H. S. Fawcett. See 119.
95. Dwarf Essex rase for winter forage. By J. M. Scott. Aug., 1908.
96. Steer-feeding. By J. M. Scott. Jan., 1909.
97. White fly studies in 1908. By E. W. Berger. Feb., 1909.
98. Scaly bark of citrus, a preliminary report. By H. S. Fawcett. Mar., 1909.
99. Milk production. By J. M. Scott. July, 1909.

100. Corn. By P. H. Rolfs. Dec., 1909.
101. Pineapple culture: VI, The effect of fertilizers upon the quality of the fruit. By A. W. Blair and R. N. Wilson. Jan., 1910.
102. The velvet bean. By J. M. Scott. Apr., 1910. A summary of 60, with additions.
103. Whitefly control. By E. W. Berger. Sept., 1910.
104. Pineapple culture: VII, Nitrates in the soil. By A. W. Blair and R. N. Wilson. Oct., 1910.
105. Japanese cane for forage. By J. M. Scott. Feb., 1911. See 129.
106. Scaly bark or "nailhead rust" of citrus (*Cladosporium herbarum* var. *citricolum*). By H. S. Fawcett. June, 1911.
107. Stem-end rot of citrus fruits (*Phomopsis* sp.). By R. S. Fawcett. Oct., 1911.
108. Diseases of citrus fruits. By P. H. Rolfs, H. S. Fawcett, and B. F. Floyd. Nov., 1911.
109. Citrus scab. By H. S. Fawcett. May, 1912.
110. Native and grade cattle-breeding. By J. M. Scott. June, 1912.
111. Melanose and stem-end rot (*Phomopsis citri*). By B. F. Floyd and H. E. Stevens. Dec., 1912.
112. Tomato insects, root knot and "white mold." By J. R. Watson. Dec., 1912. See 125.
113. Pig-feeding. By J. M. Scott. Feb., 1913. See 131.
114. Milk production, II. By J. M. Scott. June, 1913.
115. Sugar and acid in oranges and grapefruit. By S. E. Collison. July, 1913.
116. Lettuce drop. By O. F. Burger. Oct., 1913.
117. Tomato diseases. By P. H. Rolfs. Nov., 1913. See 146.
118. Sugar-cane and sirup making. By A. P. Spencer. Nov., 1913. Supersedes 44.
119. Fungus diseases of scale insects and whitefly. By P. H. Rolfs and H. S. Fawcett; revised by P. H. Rolfs. Nov., 1913. A revision of 94.
120. Irish potatoes in Florida. By A. P. Spencer. Jan., 1914. See 133.
121. Cucumber rot. By O. F. Burger. Feb., 1914.
122. Citrus canker, a preliminary bulletin. By H. E. Stevens. Mar., 1914.
123. Whitefly control, 1914. By J. R. Watson. Sept., 1914.
124. Citrus canker, II: History of citrus canker. By E. W. Berger.—Studies of citrus canker. By H. E. Stevens.—Eradication of citrus canker. By Frank Stirling. Oct., 1914.
125. Tomato insects, root knot and "white mold." By J. R. Watson. Dec., 1914. A revision of 112.
126. The woolly white fly (*Aleurothrix howardi* Quaintance). By J. R. Watson. Mar., 1915.
127. Mangoes in Florida. By P. H. Rolfs. June, 1915.
128. Citrus canker, III. By H. E. Stevens. Nov., 1915.
129. Japanese cane. By J. M. Scott. Jan., 1916. A revision of 105. See 144.
130. Control of the velvet bean caterpillar. By J. R. Watson. June, 1916.
131. Pig feeding. By J. M. Scott. June, 1916. Supplements 131. See 141.
132. Loss of fertilizers by leaching. By S. E. Collison and S. S. Walker. Nov., 1916.
133. Irish potatoes in Florida. By A. P. Spencer. Feb., 1917. A revision of 120.
134. Florida truck and garden insects. By J. R. Watson. Apr., 1917. Supersedes 34. See 151.
135. The utilization of gull citrus fruits in Florida, summarized by S. S. Walker from the original monograph by F. A. McDermott. Apr., 1917.
136. Control of root-knot by calcium cyanamide and other means. By J. R. Watson. Apr., 1917.
137. Some cases of injury to citrus trees apparently induced by ground limestone. By B. F. Floyd. June, 1917.
138. Rhodes grass. By P. H. Rolfs. June, 1917.
139. Some important diseases of truck crops in Florida. By C. D. Sherbakoff. June, 1917.
140. Dieback, or exanthema of citrus trees. By B. F. Floyd. Aug., 1917.
141. Pork production in Florida. By J. M. Scott. Nov., 1917. A revision of 113 and 131.
142. Dairying in Florida. By J. M. Scott. Jan., 1918.
143. Feeding for milk production. By J. M. Scott. Feb., 1918.
144. Fertilizers for Japanese cane. By J. M. Scott. Feb., 1918. Supplements 129.
145. Melanose, II. By H. E. Stevens. Feb., 1918.
146. Tomato diseases. By C. D. Sherbakoff. Mar., 1918. A revision of 117. Supersedes 91.
147. Diseases and insect pests of the pecan. By Julius Matz. May, 1918. Supersedes 79.
148. Insects of a citrus grove. By J. R. Watson. June, 1918.
149. Some diseases of the fig. By Julius Matz. Aug., 1918.
150. Florida citrus diseases. By H. E. Stevens. Aug., 1918.
151. Florida truck and garden insects. By J. R. Watson. Feb., 1919. A revision of 134.
152. Velvet bean varieties. By J. M. Scott. Feb., 1919.
153. Napier and Merker grasses, two new forage crops for Florida. By J. B. Thompson. Feb., 1919.
154. Citrus fertilizer experiments. By S. E. Collison. Dec., 1919.
155. Prussic acid in sorghum. By S. E. Collison. Dec., 1919.
156. Sweet potato fertilizer experiment. By J. M. Scott. Apr., 1920.
157. Soft pork studies. Preliminary report. By J. M. Scott. Apr., 1920.
158. Fertilizing the Irish potato crop. By B. F. Floyd and R. W. Ruprecht. Nov., 1920.

## GEORGIA.

## Georgia Agricultural Experiment Station, Experiment.

## BULLETINS.

1. Announcement; history; [text of the Hatch act]. By W. L. Jones. Oct., 1888.
2. Factors in agricultural investigations. By W. L. Jones.—Ash analyses of native woods. By H. C. White.—Origin of soils geologically considered. By J. W. Spencer.—The imported cabbage butterfly fly (*Pieris rapae*, L.). By J. P. Campbell.—Experiments with phosphates and kainit applied to cotton; summary of meteorological observations; preservation of the sweet potato in winter. By W. L. Jones. Jan., 1889.
3. Entomology. By J. P. Campbell.—Additional ash analyses of native woods. By H. C. White.—Cowpea as a fertilizing crop; preservation of the sweet potato in winter. By W. L. Jones. Apr., 1889.
4. Analyses of cattle foods. By C. M. Strahan. July, 1889.
5. Georgia experiment station: History; description and outline. By R. J. Redding. Oct., 1889.
6. Georgia experiment station. By R. J. Redding.—Department of entomology. By J. P. Campbell.—Department of geology: "Southern drift" and its agricultural relations. By J. W. Spencer. Jan., 1890.
7. Analyses of food [i. e. feeding] stuffs. By H. C. White.—Meteorology. By L. H. Charbonnier.—Destructive leaf-hopper. By J. P. Campbell. Apr., 1890.
8. Irish potato culture. By Gustave Speth. July, 1890.

9. Potash and paying crops, [compiled by A. de Ghequier]. Oct., 1890.  
Identical with West Virginia Sta. Special Bul. [1]; Tennessee Sta. Special Bul. D; Maryland Sta. Special Bul. B.
10. Fertilizer experiments on corn; culture experiments on corn; variety tests of corn. By R. J. Redding. Dec., 1890.
11. Fertilizer experiments, culture experiments and variety tests in: Cotton. [By R. J. Redding.]—Sweet potatoes, field peas, garden vegetables, etc. By Gustave Speth. Jan., 1891.
12. Field experiments in forage plants with analyses of the products. [By Gustave Speth.] Apr., 1891.
- 12<sup>1</sup>. Circular to the farmers of Georgia from the board of directors. By R. J. Redding. July, 1891.
13. I, Analyses of feeding stuffs. By H. C. White.—II, Forage plants. By Gustave Speth. July, 1891.
14. I, Variety and fertilizer experiments with oats; II, variety tests with wheat. By R. J. Redding.—III, Variety tests and fertilizer experiments with vegetables. By Gustave Speth. Oct., 1891.
15. I, Fertilizer experiments on corn; culture experiments on corn; variety tests of corn. [By R. J. Redding.]—II, Culture of small fruits. By Gustave Speth. Dec., 1891.
16. Fertilizer experiments on cotton; culture experiments on cotton; variety tests of cotton. [By R. J. Redding.] Feb., 1892.
- 16<sup>1</sup>. Announcement regarding station publications. Mar., 1892.
17. Irish potatoes; sweet potatoes; tomatoes; forage plants. By Gustave Speth. Mar., 1892.
- 17<sup>1</sup>. The air and the soil in their relations to agriculture. By H. C. White. July, 1892.
18. Cheese and butter dairying. [By R. J. Redding.] Oct., 1892.
19. Culture of tobacco. [By R. J. Redding.] Dec., 1892.
20. Fertilizer, culture, and variety experiments: Corn and cotton. [By R. J. Redding.] Feb., 1893.
21. I, Practical dairying; dehorning cattle; feed formulas; II, experiments with oats. [By R. J. Redding.] Aug., 1893.
22. Manures and fertilizers. By H. C. White. Oct., 1893.
23. Manures and fertilizers: I, Fertilizer, culture, and variety experiments on corn. [By R. J. Redding.]—II, Fertilizer and variety tests on field peas. By H. N. Starnes. Dec., 1893.
24. Variety, fertilizer, and culture experiments on cotton. By R. J. Redding.—Cotton crosses and hybrids. By H. N. Starnes. Feb., 1894.
25. Sweet potatoes. By H. N. Starnes. Nov., 1894.
26. Cowpeas: Fertilizer and variety tests. By H. N. Starnes. Dec., 1894.
27. I, Fertilizer, culture, and variety experiments on corn; II, fertilizer and variety tests on cotton; III green manuring with cowpeas. By R. J. Redding. Dec., 1894.
28. Grape culture. By H. N. Starnes. Sept., 1895.
29. Irish potatoes. By H. N. Starnes. Oct., 1895.
30. Corn culture; oat culture. By R. J. Redding. Nov., 1895.
31. Cotton culture. By R. J. Redding. Dec., 1895.
32. Strawberries. By H. N. Starnes. Sept., 1896.
33. The cultivated blackberries and dewberries. By H. N. Starnes. Oct., 1896.
34. Corn culture. By R. J. Redding. Nov., 1896.
35. Cotton culture. By R. J. Redding. Dec., 1896.
36. The San José and other scales in Georgia. By H. N. Starnes. Oct., 1897.
37. Corn culture. By R. J. Redding. Nov., 1897.
38. Watermelons. By H. N. Starnes. Dec., 1897.
39. Cotton culture; fertilizer formulas. By R. J. Redding. Dec., 1897.
40. The Stringfellow root pruning theory. By H. N. Starnes. Sept., 1898.
41. Corn culture: Fertilizer, variety, and culture tests. By R. J. Redding. Oct., 1898.
42. Some peach notes. By H. N. Starnes. Nov., 1898.
43. Fertilizer, culture, and variety experiments on cotton. By R. J. Redding. Dec., 1898.
44. Wheat and oats, rye and barley. By R. J. Redding. Sept., 1899.
45. Some important insect enemies of cucurbits. By A. L. Quaintance. Oct., 1899.
46. Corn culture. By R. J. Redding. Nov., 1899.
47. Fertilizer, culture, and variety experiments on cotton. By R. J. Redding. Dec., 1899.
48. Strawberry notes for 1899. By A. L. Quaintance. Jan., 1900.
49. Practical dairying. By R. J. Redding and H. J. Wing. Sept., 1900.
50. The brown rot of peaches, plums, and other fruits (*Monilia fructigena* Persoon). By A. L. Quaintance. Oct., 1900.
51. Corn culture. By R. J. Redding. Nov., 1900.
52. Cotton culture. By R. J. Redding. Jan., 1901.
53. Second report on grapes. By A. L. Quaintance. June, 1901.
54. The pickle worm (*Margaronia nitidalis* Cramer). By A. L. Quaintance. July, 1901.
55. Corn culture. By R. J. Redding. Nov., 1901.
56. Cotton culture. By R. J. Redding. Jan., 1902.
57. Cantaloupe culture in Georgia. By S. H. Fulton. Aug., 1902.
58. Corn culture. By R. J. Redding. Dec., 1902.
59. Cotton culture. By R. J. Redding. Dec., 1902.
60. Common ailments of breeding cattle. By C. L. Willoughby. Mar., 1903.
61. The fig in Georgia. By H. N. Starnes. Nov., 1903.
62. Corn culture. By R. J. Redding. Dec., 1903.
63. Cotton culture. By R. J. Redding. Dec., 1903.
64. Cattle ticks and Texas fever. By C. L. Willoughby. Aug., 1904.
65. Corn culture. By R. J. Redding. Nov., 1904.
66. Cotton culture. By R. J. Redding. Dec., 1904.
67. The plum in Georgia. By H. N. Starnes. Dec., 1904.
68. Japan and hybrid plums. By H. N. Starnes. Aug., 1905.
69. Corn culture. By R. J. Redding. Nov., 1905.
70. Cotton culture. By R. J. Redding. Dec., 1905.
71. Some field notes on soil inoculation. By H. N. Starnes. Dec., 1905.
72. Fertilization. By R. J. Redding and H. N. Starnes. Mar., 1906.
73. The peach-tree borer. By H. N. Starnes. June, 1906.
74. Corn culture. By R. J. Redding and J. M. Kimbrough. Nov., 1906.
75. Cotton culture. By R. J. Redding and J. M. Kimbrough. Dec., 1906.
76. Feeding Tennessee steers in Georgia. By C. L. Willoughby and P. N. Flint. June, 1907.
77. The fig in Georgia. (Second report). By H. N. Starnes and J. F. Monroe. Nov., 1907.
78. Corn culture. By M. V. Calvin and J. M. Kimbrough. Nov., 1907.
79. Cotton culture. By M. V. Calvin and J. M. Kimbrough. Dec., 1907.
80. Cooperative dairy investigations by the Georgia Experiment Station and the Dairy Division, United States Department of Agriculture. By P. N. Flint and J. E. Dorman. July, 1908.
81. (Technical series No. 1.) The effect of carbonates upon nitrification. By W. L. Owen. Sept., 1908.
82. Sugar corn and tomatoes. By T. H. McHatton. Oct., 1908.



83. (Technical series No. 2.) The Mendelian and DeVriesian laws applied to cotton breeding. By R. J. H. DeLoach. Oct., 1908.
84. Corn and cotton. By J. M. Kimbrough. Dec., 1908.
85. (Technical series No. 3.) Some studies on the *Colletotrichum gossypii*. By J. H. DeLoach. July, 1909.
86. Sorghum versus corn meal as a source of carbohydrates for dairy cattle. By P. N. Flint. July, 1909.
87. Spanish peanuts, soy beans, and skim-milk as feeds supplementary to corn. By P. N. Flint. Nov., 1909.
88. Corn culture. By J. M. Kimbrough. Dec., 1909.
89. Cotton culture. By J. M. Kimbrough. Dec., 1909.
90. Protein requirements of growing cattle under one year of age. By P. N. Flint. July, 1910.
91. Cabbage culture. By H. P. Stuckey. Sept., 1910.
92. The cotton red spider. By E. L. Worsham. Nov., 1910.
93. Corn production. By M. V. Calvin. Nov., 1910.
94. Cotton production. By M. V. Calvin. Dec., 1910.
95. The influence of stall manure upon the bacterial flora of the soil. By J. C. Temple. Sept., 1911.
96. Tomatoes: I, Varieties, culture, and canning; II, blossom-end rot. By H. P. Stuckey and J. C. Temple. Nov., 1911. See 112.
97. Corn culture. By J. M. Kimbrough. Nov., 1911.
98. Cotton culture. By J. M. Kimbrough. Dec., 1911.
99. Mendelian inheritance in cotton hybrids. By C. A. McLendon. Aug., 1912.
100. Cotton culture. By J. M. Kimbrough. Dec., 1912.
101. The mole cricket. By E. L. Worsham and W. V. Reed. Dec., 1912.
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103. Nitrification in acid or nonbasic soils. By J. C. Temple. Jan., 1914.
104. Corn culture. By J. M. Kimbrough. Jan., 1914.
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106. Vegetable gardening. By H. P. Stuckey.—Combating insect pests and fungus diseases of garden plants. By B. B. Higgins and H. P. Stuckey. Feb., 1914.
107. Sweet potatoes, culture, storing and studies in fertilizing. By H. P. Stuckey. Mar., 1914.
108. The feeding of cotton. By H. C. White. April, 1914.
109. Digestion and metabolism of a steer when placed on a continuous ration of corn silage. By P. V. Ewing and C. A. Wells. Dec., 1914.
110. Silos and silage. By P. V. Ewing. Dec., 1914.
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113. Variety work with corn and cotton. By C. K. McClelland. Jan., 1915.
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118. Plum wilt, its nature and cause. By B. B. Higgins. Jan., 1916.
119. Acidosis and cottonseed meal injury. By C. A. Wells and P. V. Ewing. Mar. 20, 1916.
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123. Irish potato spraying. By H. P. Stuckey and B. B. Higgins. July, 1916.
124. The two groups of varieties of the *Hicora* pecan and their relation to self-sterility. By H. P. Stuckey. Oct., 1916.
125. The associative digestibility of corn silage and cottonseed meal in steer rations, Part II. By P. V. Ewing, C. A. Wells and F. H. Smith. Feb., 1917.
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131. A comparison of certain raw phosphates with acid phosphate for fertilizing cotton. By T. E. Keitt and A. W. Murray. Nov., 1919.
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137. Cotton fertilization experiments, 1920. By F. H. Smith and T. S. Buie. Dec., 1920.
138. Tomato wilt. By J. A. McClintock. Dec., 1920.

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1. Chickens and their diseases in Hawaii. By T. F. Sedgwick. 1901.
2. The root rot of taro. By T. F. Sedgwick. 1902.
3. Insecticides for use in Hawaii. By D. L. Van Dine. 1903. Revised edition, 1904.
4. The cultivation of sisal in Hawaii. By F. E. Conter. 1093.
5. A sugar-cane leaf-hopper in Hawaii. By D. L. Van Dine. 1904.
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7. The banana in Hawaii. By J. E. Higgins. 1904.
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45. Potato diseases in Hawaii and their control. By C. W. Carpenter. Jan. 24, 1920.

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4. Methods of preventing smut in wheat and oats; carbon bisulphide as a squirrel exterminator; a new squirrel exterminator. By C. P. Fox. July, 1893.
5. The relation of meteorology to the agricultural interests of Idaho. By J. E. Bonebright. Oct., 1893.
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108. Sprays for the control of San José scale. By W. C. Edmundson. Feb., 1918.

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30. Blackberries and raspberries: Variety tests and management. By G. W. McCluer. Mar., 1894.
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39. The Russian thistle and some plants that are mistaken for it. By G. P. Clinton. Apr., 1895.

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41. Experiments with wheat, 1888-1895; experiments with oats, 1888-1895. By Eugene Davenport and W. J. Fraser. Mar., 1896.
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55. Improvement in the chemical composition of the corn kernel. By C. G. Hopkins. June, 1899.
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61. The farmer's vegetable garden. By J. W. Lloyd. Jan., 1901.
62. The market classes of horses. By Eugene Davenport. Feb., 1901. See 122.
63. Seed corn and some standard varieties for Illinois. By A. D. Shamel. Mar., 1901.
64. Treatment of oats for smut. By A. D. Shamel. Mar., 1901.
65. Construction and care of earth roads. By I. O. Baker. Mar., 1901.
66. Individual differences in the value of dairy cows. By W. J. Fraser. Mar., 1901.
67. Applescab. By G. P. Clinton. Dec., 1901.
68. Important details of spraying. By A. V. Steubenrauch. Jan., 1902.
69. Apple rots in Illinois. By G. P. Clinton. Feb., 1902.
70. Canker of apple trees. By Heinrich Hasselbring. Apr., 1902.
71. Experiments with insecticides for the San José scale. By S. A. Forbes. Apr., 1902.
72. Additional insecticide experiments for the San José scale. By S. A. Forbes. May, 1902.
73. Comparison of silage and shock corn for wintering calves intended for beef production. By H. W. Mumford. June, 1902.
74. Standard milk and cream. By W. J. Fraser. June, 1902.
75. Standardization of milk and cream. By Oscar Erf. July, 1902.
76. Alfalfa on Illinois soils. By C. G. Hopkins. July, 1902. Other editions, May, 1903; Mar., 1906; June, 1910; July, 1913.
77. Bitter rot of apples. By T. J. Burrill and J. C. Blair. July, 1902.
78. Market classes and grades of cattle, with suggestions for interpreting market quotations. By H. W. Mumford. July, 1902. Second edition, July, 1904. See 90.
79. The corn bill-gus in Illinois. By S. A. Forbes. Oct., 1902.
80. Methods and results of field insecticide work against the San José scale, 1899-1902. By S. A. Forbes. Oct., 1902.
81. Forcing tomatoes. By A. C. Beal. Nov., 1902.
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83. Feeds supplementary to corn for fattening steers. By H. W. Mumford. Jan., 1903.
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85. Records of individual cows on dairy farms. By A. J. Glover. June, 1903.
86. Climate of Illinois. By J. G. Mosier. June, 1903. See 208.
87. The structure of the corn kernel and the composition of its different parts. By C. G. Hopkins, L. H. Smith, and E. M. East. Aug., 1903. Other editions, May, 1906; Feb., 1913.
88. Soil treatment for wheat in rotations, with special reference to southern Illinois soils. By C. G. Hopkins. Aug., 1903.
89. Notes on the insecticide use of the gasoline blast lamp. By S. A. Forbes. Nov., 1903. Also abstract edition, Dec., 1903.
90. Fattening steers of the various market grades. By H. W. Mumford. Dec., 1903. Supplements 78.
91. Preventing contamination of milk. By W. J. Fraser. Dec., 1903.
92. City milk supply. By W. J. Fraser. Dec., 1903.
93. Soil treatment for peaty swamp lands, including reference to sand and "alkali" soils. By C. G. Hopkins. Jan., 1904. See 157.
94. Nitrogen bacteria and legumes. By C. G. Hopkins. Feb., 1904. Other editions, Nov., 1905; Feb., 1910; Feb., 1912.
95. The more important insect injuries to Indian corn. By S. A. Forbes. Nov., 1904.
96. The testing of corn for seed. By A. N. Hume. Nov., 1904. Other editions, Jan., 1906; Oct., 1908.
97. Market classes and grades of swine. By William Dietrich. Nov., 1904.
98. The curculio and the apple. By C. S. Crandall. Feb., 1905.
99. Soil treatment for the lower Illinois glaciation. By C. G. Hopkins and J. E. Readhimer. Mar., 1905.
100. Directions for the breeding of corn, including methods for the prevention of inbreeding. By C. G. Hopkins, L. H. Smith, and E. M. East. Mar., 1905. Other editions, Jan., 1907; Feb., 1913.
101. Crops for the silo, cost of filling, and effect of silage on the flavor of milk. By W. J. Fraser. Apr., 1905.
102. The construction of silos. By W. J. Fraser. June, 1905.
103. Comparison of methods of preparing corn and clover hay for fattening steers. By H. W. Mumford. Aug., 1905.
104. Field experiments and observations on insects injurious to Indian corn. By S. A. Forbes. Oct., 1905. Also abstract edition, Nov., 1905.
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106. Spraying apples: Relative merits of liquid and dust applications. By C. S. Crandall. Feb., 1906.
107. Comparative experiments with various insecticides for the San José scale. By S. A. Forbes. Apr., 1906. Also abstract edition Apr., 1906.
108. Spraying apples for the plum curculio. By S. A. Forbes. May, 1906. Also abstract edition, May, 1906.

109. The location, construction, and operation of hog houses. By William Dietrich. June, 1906. Second edition, 1912.
110. Storage barn, sheds, feed lots and other equipment for feeding experimental cattle in car load lots. By H. W. Mumford and E. S. Good. July, 1906.
111. Maintenance rations for beef breeding cows. By H. W. Mumford. Aug., 1906. Reprint with minor changes. Mar., 1914.
112. The cottony maple scale in Illinois. By S. A. Forbes. Jan., 1907. Also abstract edition.
113. The shrinkage of ear corn in cribs. By A. N. Hume and O. D. Center. Mar., 1907.
114. Spraying for the codling moth. By J. W. Lloyd. Mar., 1907.
115. Soil improvement for the worn hill lands of Illinois. By C. G. Hopkins and J. E. Readhimer. Apr., 1907.
116. On the life history, habits, and economic relations of the white grubs and May beetles. By S. A. Forbes. Aug., 1907.
117. Bitter rot of apples: Horticultural investigations. By J. C. Blair. Aug., 1907.
118. Bitter rot of apples: Botanical investigations. By T. J. Burrill. Sept., 1907.
119. Type and variability in corn. By Eugene Davenport and H. L. Rietz. Oct., 1907. Appendix, p. 27-38. Graphic representation of statistics by H. L. Rietz, was not included in all copies issued.
120. Milk supply of Chicago and twenty-six other cities. By J. M. Trueman. Nov., 1907.
121. Variety tests of wheat. By A. N. Hume, O. D. Center, and Leonard Hegnauer. Jan., 1908.
122. Market classes and grades of horses and mules. By R. C. Obrecht. Jan., 1908. Supersedes 62.
123. The fertility in Illinois soils. By C. G. Hopkins and J. H. Pettit. Feb., 1908. Second edition, Mar., 1911.
124. Marketing the muskmelon. By J. W. Lloyd. Apr., 1908.
125. Thirty years of crop rotations on the common prairie soil of Illinois. By C. G. Hopkins, J. E. Readhimer, and W. G. Eckhardt. May, 1908.
126. Distance between hills for corn in the Illinois corn belt. By A. N. Hume, C. D. Center, and Leonard Hegnauer. July, 1908.
127. A study of the factors influencing the improvement of the potato. By E. M. East. Aug., 1908. Also abstract edition.
128. Ten generations of corn breeding. By L. H. Smith. Sept., 1908. Appendix, p. 489-575, chiefly tables, was not included in all copies issued.
129. Market classes and grades of sheep. By W. C. Coffey. Nov., 1908. Reprint with minor changes. Mar., 1914.
130. Experiments with repellents against the corn root-aphis, 1905 and 1906. By S. A. Forbes. Dec., 1908.
131. Habits and behavior of the corn-field ant, *Lasius niger americanus*. By S. A. Forbes. Dec., 1908.
132. The effect of selection upon certain physical characters in the corn plant. By L. H. Smith. Feb., 1909. Reprint with minor changes. Mar., 1915.
133. Ear rots of corn. By T. J. Burrill and J. T. Barrett. Feb., 1909.
134. The insect pests of clover and alfalfa. By J. W. Folsom. Apr., 1909.
135. Bordeaux mixture. By C. S. Crandall. May, 1909. Also abstract edition.
136. Methods of seeding oats, drilling and broadcasting. By A. N. Hume, O. D. Center, and Leonard Hegnauer. July, 1909.
137. A study of factors influencing the composition of butter. By C. E. Lee, N. W. Hepburn, and J. M. Barnhart. Sept., 1909.
138. Pasteurization as a factor in making butter from cream skimmed on the farm. By C. E. Lee. Sept., 1909.
139. Composition of market butter. By C. E. Lee and J. M. Barnhart. Oct., 1909.
140. Dairy suggestions from European conditions as seen in the British Isles, Holland, and Denmark. By W. J. Fraser and R. E. Brand. Oct., 1909.
141. Relative efficiency of different rations for fleshing horses for market. By R. C. Obrecht. Nov., 1909.
142. Short-fed steers: A comparison of methods of feeding. By H. W. Mumford and H. O. Allison. Nov., 1909. Reprint [with minor changes.] Mar., 1914.
143. Economy of the round dairy barn. By W. J. Fraser. Feb., 1910.
144. Growing tomatoes for early market. By J. W. Lloyd and I. S. Brooks. Feb., 1910. Four editions, last, Mar., 1914.
145. Quantitative relationships of carbon, phosphorus, and nitrogen in soils. By Robert Stewart. Apr., 1910. Second edition, 1912.
146. Alfalfa hay versus timothy hay and alfalfa hay versus bran for dairy cows. By W. J. Fraser and C. C. Hayden. June, 1910. Other editions Nov., 1912; Apr., 1916.
147. Market classes and grades of meat. By L. D. Hall. July, 1910. Also abstract edition.
148. On the measurement of correlation with special reference to some characters of Indian corn. By H. L. Rietz and L. H. Smith. Nov., 1910. Also abstract edition.
149. Tuberculosis of farm animals. By C. F. Briscoe and W. J. MacNeal. Feb., 1911. Also abstract edition.
150. Feeding farm work horses. By R. C. Obrecht. Aug., 1911.
151. Some important insects of Illinois shade trees and shrubs. By S. A. Forbes. Oct., 1911.
152. Contagious abortion of cows. By W. J. MacNeal and H. W. Mumford. Nov., 1911.
153. Comparison of methods of sampling cream for testing. By C. E. Lee and N. W. Hepburn. Feb., 1912. Also abstract edition.
154. What is the matter with the elms in Illinois? By S. A. Forbes. Feb., 1912.
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156. Insects injurious to stored grains and their ground products. By A. A. Girault. July, 1912.
157. Peaty swamp lands; sand and alkali soils. By C. G. Hopkins, J. E. Readhimer, and O. S. Fisher. July, 1912. Includes results previously published in 93.
158. Relative economy, composition, and nutritive value of the various cuts of beef. By L. D. Hall and A. D. Emmett. July, 1912. Appendix, p. 200-233, consisting of tables, was not included in all copies issued.
159. Balanced versus unbalanced rations for dairy cows. By W. J. Fraser and C. C. Hayden. July, 1912.
160. Official records of purebred dairy cows. By C. C. Hayden. July, 1912.
161. Fate of tubercle bacilli outside the animal body. By C. F. Briscoe. Nov., 1912. Also abstract edition.
162. Tuberculosis in the university dairy herd. By C. C. Hayden. Jan., 1913.
163. The maintenance requirement of swine. By William Dietrich. June, 1913. Also abstract edition.
164. Milk required to raise a dairy calf. By W. J. Fraser and R. E. Brand. July, 1913.
165. The element of uncertainty in the interpretation of feeding experiments. By H. H. Mitchell and H. S. Grindley. July, 1913. Also abstract edition.
166. A review of American investigations on fattening lambs with special reference to the protein and energy requirements. By Sleeter Bull and A. D. Emmett. Jan., 1914. Also abstract edition.
167. Proportions of shelled corn and alfalfa hay for fattening western lambs. By W. C. Coffey. Mar., 1914.

168. A study of the development of growing pigs with special reference to the influence of the quantity of protein consumed. By A. D. Emmett, H. S. Grindley, W. E. Joseph and R. H. Williams. Mar., 1914. Also abstract edition.
169. A study of the ash content of growing pigs with special reference to the influence of the quantity of protein consumed. By R. H. Williams and A. D. Emmett. May, 1914. Also abstract edition.
170. Coefficients of digestibility of some common rations for swine. By William Dietrich and H. S. Grindley. May, 1914. Also abstract edition.
171. A study of the phosphorus content of growing pigs with special reference to the influence of the quantity of protein consumed. By R. H. Williams and A. D. Emmett. June, 1914. Also abstract edition.
172. A study of the digestibility of rations for steers with special reference to the influence of the character and the amount of feed consumed. By H. W. Mumford [and others]. June, 1914. Also abstract edition.
173. A study of the forms of nitrogen in growing pigs with special reference to the influence of the quantity of protein consumed. By W. E. Joseph. June, 1914. Also abstract edition.
174. An efficient and practicable method for controlling melon lice. By C. E. Durst. July, 1914.
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176. The use of commercial fertilizers in growing carnations. By H. B. Dornier, F. W. Muncie, and A. H. Nehrling. Nov., 1914. Also abstract edition.
177. Radium as a fertilizer. By C. G. Hopkins and W. H. Sachs. Jan., 1915.
178. Recent Illinois work on the corn root-aphis and the control of its injuries. By S. A. Forbes. Jan., 1915.
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180. Observations and experiments on the San José scale. By S. A. Forbes. Mar., 1915.
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182. Potassium from the soil. By C. G. Hopkins and J. P. Aumer. May, 1915.
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186. A general survey of the May beetles (Phyllophaga) of Illinois. By S. A. Forbes. Feb., 1916.
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190. Soil bacteria and phosphates. By C. G. Hopkins and A. L. Whiting. June, 1916.
191. Yields of different varieties of corn in Illinois. By W. L. Burlison and O. M. Allyn. Aug., 1916.
192. Feeding pure-bred draft fillies. By J. L. Edmonds. Dec., 1916.
193. Summary of Illinois soil investigations. By C. G. Hopkins, J. G. Mosier, and F. C. Bauer. Dec., 1916.
194. A new limestone tester. By C. G. Hopkins. Jan., 1917. Bul. 194 supersedes Cir. 185.
195. Yields of spring grains in Illinois. By W. L. Burlison and O. M. Allyn. Jan., 1917.
196. The use of commercial fertilizers in growing roses. By F. W. Muncie. Feb., 1917. Also abstract edition.
197. A study of the rate and economy of gains of fattening steers with special reference to the influence of the amount and the character of feed consumed. By H. W. Mumford, H. S. Grindley, A. D. Emmett, and Sleetor Bull. Mar., 1917. Also abstract edition.
198. Soybeans and cowpeas in Illinois. By W. L. Burlison and O. M. Allyn. Apr., 1917.
199. Germ content of milk: I, As influenced by the factors at the barn. By M. J. Prucha and H. M. Weeter. May, 1917.
200. Digestion experiments with pigs with special reference to the influence of one feed upon another, and to the individuality of pigs. By H. S. Grindley, W. J. Carmichael, and C. I. Newlin. May, 1917. Also abstract edition.
201. Yields of winter grains in Illinois. By W. L. Burlison and O. M. Allyn. June, 1917.
202. Is symbiosis possible between legume bacteria and non-legume plants. By T. J. Burrill and Roy Hansen. July, 1917. Also abstract edition.
203. Seed production in apples. By C. S. Crandall. Aug., 1917. Also abstract edition.
204. Germ content of milk: II, As influenced by the utensils. By M. J. Prucha, H. M. Weeter, and W. H. Chambers. Feb., 1918.
205. The grasses of Illinois. By Edna Mosher. Mar., 1918.
206. Field experiments in spraying apple orchards in 1913 and 1914. By B. S. Pickett, O. S. Watkins, W. A. Ruth, and A. J. Gunderson. Apr., 1918. Also abstract edition.
207. Washing of soils and methods of prevention. By J. G. Mosier and A. F. Gustafson. Apr., 1918.
208. Climate of Illinois. By J. G. Mosier. Apr., 1918. Also abstract edition.
209. Fertilizing constituents excreted by two-year old steers. By H. S. Grindley, H. W. Mumford, A. D. Emmett, and Sleetor Bull. June, 1918. Also abstract edition.
210. Field investigations of forage poisoning in cattle and horses. By H. P. Rusk and H. S. Grindley. June, 1918.
211. Apple-bud selection; apple seedlings from selected trees. By C. S. Crandall. June, 1918. Also abstract edition.
212. Limestone action on acid soils. By Robert Stewart and F. A. Wyatt. Jan., 1919. Also abstract edition.
213. Two Illinois rhubarb diseases. By F. L. Stevens. Jan., 1919.
214. Spring wheat for Illinois. By W. L. Burlison and R. W. Stark. Feb., 1919.
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219. Illinois crop yields from soil experiment fields. By C. G. Hopkins, F. W. Garrett, J. E. Whitechurch, and H. F. T. Fahrnkopf. May, 1919.
220. Black spot of onion sets: *Volvetella circinans* and its perithecial form, *Cleistothecopsis circinans*. By F. L. Stevens and Esther Y. True. May, 1919.
221. Snapdragon rust. By G. L. Peltier. Aug., 1919.
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224. The seasonal cost of milk production. By F. A. Pearson. Dec., 1919.
225. Nitrate production in field soils in Illinois. By A. L. Whiting and W. R. Schoonover. Mar., 1920. Also abstract edition.
226. Variations in farrow, with special reference to the birth weight of pigs. By W. J. Carmichael and J. B. Rice. May, 1920. Also abstract edition.

227. Sulfur in relation to soil fertility. By Robert Stewart. June, 1920.  
 228. An epidemic of rosy milk. By H. A. Harding and M. J. Prucha. June, 1920.  
 229. Dendrophoma leaf blight of strawberry. By H. W. Anderson. July, 1920.  
 230. Elimination of germs from dairy utensils: I, By rinsing; II, by drying in sun and air. By M. J. Prucha and H. A. Harding. Nov., 1920.

## SOIL REPORTS.

1. Clay County soils. By C. G. Hopkins, J. G. Mosier, J. H. Pettit, and J. E. Readhimer. Mar., 1912.
2. Moultrie County soils. By C. G. Hopkins, J. G. Mosier, J. H. Pettit, and J. E. Readhimer. June, 1911.
3. Hardin County soils. By C. G. Hopkins, J. G. Mosier, J. H. Pettit, and J. E. Readhimer. Aug., 1912.
4. Sangamon County soils. By C. G. Hopkins, J. G. Mosier, J. H. Pettit, and J. E. Readhimer. Sept., 1912.
5. La Salle County soils. By C. G. Hopkins, J. G. Mosier, J. H. Pettit, and J. E. Readhimer. July, 1913.
6. Knox County soils. By C. G. Hopkins, J. G. Mosier, J. H. Pettit, and J. E. Readhimer. Aug., 1913.
7. McDonough County soils. By C. G. Hopkins, J. G. Mosier, J. H. Pettit, and O. S. Fisher. Sept., 1913.
8. Bond County soils. By C. G. Hopkins, J. G. Mosier, J. H. Pettit, and O. S. Fisher. Oct., 1913.
9. Lake County soils. By C. G. Hopkins, J. G. Mosier, E. Van Alstine, and F. W. Garrett. Apr., 1915.
10. McLean County soils. By C. G. Hopkins, J. G. Mosier, E. Van Alstine, and F. W. Garrett. May, 1915.
11. Pike County soils. By C. G. Hopkins, J. G. Mosier, E. Van Alstine, and F. W. Garrett. June, 1915.
12. Winnebago County soils. By C. G. Hopkins, J. G. Mosier, E. Van Alstine, and F. W. Garrett. Jan., 1916.
13. Kankakee County soils. By C. G. Hopkins, J. G. Mosier, E. Van Alstine, and F. W. Garrett. June, 1918.
14. Tazewell County soils. By C. G. Hopkins, J. G. Mosier, E. Van Alstine, and F. W. Garrett. Oct., 1916.
15. Edgar County soils. By C. G. Hopkins, J. G. Mosier, E. Van Alstine, and F. W. Garrett. Mar., 1917.
16. Du Page County soils. By C. G. Hopkins, J. G. Mosier, E. Van Alstine, and F. W. Garrett. Aug., 1917.
17. Kane County soils. By C. G. Hopkins, J. G. Mosier, E. Van Alstine, and F. W. Garrett. Aug., 1917.
18. Champaign County soils. By C. G. Hopkins, J. G. Mosier, E. Van Alstine, and F. W. Garrett. Nov., 1918.

## INDIANA.

## Agricultural Experiment Station of Indiana, Lafayette.

BULLETINS.<sup>4</sup>

1. The Hessian fly. By F. M. Webster. [Jan.], 1885.
2. Experiments with nitrogenous, phosphatic, and other fertilizers. By W. C. Latta. [Jan.], 1885.
3. Insects affecting growing wheat. By F. M. Webster. [Apr.], 1885.
4. Experiments with wheat. By W. C. Latta. [Sept.], 1885.
5. Experiments with small fruits. By James Troop. [Nov.], 1885.
6. Experiments with oats and corn. By W. C. Latta. [Mar.], 1886.
7. Commercial fertilizers and notes on agricultural chemistry. By R. B. Warder. 1886.
8. Experiments with wheat. By W. C. Latta. [Aug.], 1886.
9. The American Meromyza. By F. M. Webster. [Oct.], 1886.
10. Report of the director of the Indiana State Horticultural Experiment Stations. By James Troop. Dec., 1886.
11. Commercial fertilizers. By R. B. Warder. 1887.
12. Experiments with wheat. By W. C. Latta. [Aug.], 1887.
13. Report of new organization. By J. H. Smart. Jan., 1888.
14. Experiments with oats and corn. By W. C. Latta. Apr., 1888.
15. Concerning the potato tuber. By J. C. Arthur. June, 1888.
16. Experiments with wheat; crop rotations. By W. C. Latta. Aug., 1888.
17. Parturient apoplexy. By T. D. Hinebaugh. Nov., 1888.
18. Experiments with vegetables. By James Troop. Jan., 1889.
19. Spitting of peaches and cucumbers. By J. C. Arthur. Jan., 1889.
20. Experiments in cross-fertilization; the culture of tropical ferns. By Pierre Van Landeghem. Jan., 1889.
21. Rational feeding. By C. A. Wulff. Feb., 1889.
22. Commercial fertilizers. By H. A. Huston. Mar., 1889.
23. Experiments with corn. By W. C. Latta. Apr., 1889.
24. Experiments on milk production: Cold versus warm water; divided milkings; studies on milk secretions. By C. A. Wulff. May, 1889.
25. Entomological experiments. By F. M. Webster. June, 1889.
26. Wheat rust. By H. L. Bolley. July, 1889.
27. Field experiments with wheat. By W. C. Latta. Aug., 1889.
28. Smut of wheat and oats. By J. C. Arthur. Sept., 1889.
29. Grasses of Indiana. By James Troop. Dec., 1889.
30. Influenza. By T. D. Hinebaugh. Feb., 1890.
31. Small fruits and vegetables. By James Troop. Apr., 1890.
32. Treatment of smut in wheat. By J. C. Arthur.—Field experiments with wheat. By W. C. Latta.—A note on two inferior fertilizers. By C. S. Plumb. July, 1890.
33. Small fruits. By James Troop.—Entomological notes. By F. M. Webster.—The absorptive power of soils. By H. A. Huston and Arthur Goxss. Oct., 1890.
34. Sugar beets. By H. A. Huston. Field experiments with commercial fertilizers and manure on barley and oats. By W. C. Latta.—Tests of vegetables. By James Troop. Feb., 1891.
35. Loose smut of oats. By J. C. Arthur. Mar., 1891. Pages 98-108 containing tables of germination are omitted from the larger part of the edition.
36. Field experiments with wheat; testing grain. By W. C. Latta.—Wheat scab. By J. C. Arthur.—Forms of nitrogen for wheat. By H. A. Huston. Aug., 1891.
37. 1, Steer feeding: A comparison of cut with uncut clover. By C. S. Plumb.—2, The composition and valuation of Indiana feeding stuffs. By H. A. Huston. Dec., 1891.
38. 1, Small fruits; 2, treatment of powdery mildew and black rot; 3, vegetables. By James Troop. Mar., 1892.

<sup>4</sup> Bulletins of the experiment station properly begin with No. 13, previous numbers having been issued as bulletins of the Purdue University School of Agriculture prior to the organization of the experiment station under the Hatch Act.



39. 1, Field experiments with corn. By W. C. Latta.—2, Sugar beets. By H. A. Huston.—3, Diseases of the sugar-beet root. By J. C. Arthur and K. E. Golden. Apr., 1892.
40. The silo and silage in Indiana. By C. S. Plumb. June, 1892.
41. 1, Field experiments with wheat. By W. C. Latta.—2, Forms of nitrogen for wheat. By H. A. Huston. Aug., 1892.
42. The potato: The relation of number of eyes on the seed tuber to the product. By J. C. Arthur. Nov., 1892.
43. a, Field experiments with corn. By W. C. Latta.—b, The sugar beet in Indiana. By H. A. Huston. Mar., 1893.
44. Dairy experiments. By C. S. Plumb. May, 1893.
45. 1, Field experiments with wheat. By W. C. Latta.—2, Forms of nitrogen for wheat. By H. A. Huston. Aug., 1893.
46. 1, A modification of Grandeau's method for the determination of humus; 2, preliminary investigations relating to the determination of crude fiber. By H. A. Huston and W. F. McBride. Sept., 1893.
47. 1, Does it pay to shelter milch cows in winter? 2, Upon skim milk as a food for calves. By C. S. Plumb. Nov., 1893.
48. Experiments with small fruits. By James Troop. Jan., 1894.
49. Sugar beets. By H. A. Huston. Mar., 1894.
50. Field experiments with corn and oats. By W. C. Latta. Apr., 1894.
51. 1, Field experiments with wheat. By W. C. Latta and G. R. Ives.—II, Forms of nitrogen for wheat. By H. A. Huston. Aug., 1894.
52. Wild or prickly lettuce. By J. C. Arthur. Nov., 1894.
53. Horticulture and entomology: a, Influence of climate on onions from seed; b, potato scab; c, Russian apples in Indiana; d, protecting fruit from birds; e, the fruit bark-beetles. By James Troop. Dec., 1894.
54. New chemical apparatus. By H. A. Huston. Feb., 1895.
55. Experiments with small fruits. By James Troop.—Experiments with corn and oats. By W. C. Latta and G. R. Ives.—Sugar beets. By H. A. Huston. Mar., 1895.
56. Field experiments with wheat. By W. C. Latta and S. P. Carithers.—Potato scab and its prevention. By J. C. Arthur. Aug., 1895.
57. The improvement of unproductive black soils. By H. A. Huston. Nov., 1895.
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59. Bacteriosis of carnations. By J. C. Arthur and H. L. Bolley. Mar., 1896.
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15. A bacteriological study of blue milk. By B. W. Hammer. Feb., 1914.
16. Chemical changes during silage formation. By R. E. Neidig. July, 1914.
17. Determination of ammonia in soils. By R. S. Potter and R. S. Snyder. Oct., 1914.
18. Sulfonation in soils. By P. E. Brown and E. H. Kellogg. Dec., 1914.
19. Bacteriological studies on the coagulation of evaporated milk. By B. W. Hammer. Jan., 1915.
20. Bacteriological studies on two yellow milk organisms. By B. W. Hammer. Jan., 1915.
21. Hardiness in the apple as correlated with structure and composition. By S. A. Beach and F. W. Allen, jr. Mar., 1915.
22. Slimy andropy milk. By R. E. Buchanan and B. W. Hammer. July, 1915.
23. Relation of moisture to seed production in alfalfa. By J. N. Martin. July, 1915.



24. Determination of amino acids and nitrates in soils: Amino acids, ammonia and nitrates in manured and limed soil. By R. S. Potter and R. S. Snyder. July, 1915.
25. Bacterial activities and crop production. By P. E. Brown. July, 1915.
26. Studies on the determination of sulfur as barium sulfate. By P. L. Blumenthal and S. C. Guernsey. Sept., 1915.
27. Studies on the formation of gas in milk. By B. W. Hammer. Jan., 1916.
28. Studies on the clarification of milk. By B. W. Hammer. Jan., 1916.
29. Studies on the numbers of bacteria in milk showing various changes. By B. W. Hammer and R. H. Hix. Jan., 1916.
30. Inheritance of color and horns in blue gray cattle. By Orren Lloyd-Jones and J. M. Evvard. Jan., 1916.
31. Studies on the creaming ability of milk. By B. W. Hammer. July, 1916.
32. Estimation of calcium in ash of forage plants and animal carcasses. By S. B. Kuzirian. Mar., 1916.
33. Studies on a fusarium disease of corn and sorghum. (Preliminary.) By L. H. Pammel, Charlotte M. King, and J. L. Seal. Mar., 1916.
34. Studies in sulfification. By P. E. Brown and H. W. Johnson. July, 1916.
35. Effect of some manganese salts on ammonification and nitrification. By P. E. Brown and G. A. Minges. July, 1916.
36. Influence of humus forming materials of different nitrogen-carbon ratios on bacterial activities. By P. E. Brown and F. E. Allison. July, 1916.
37. Environmental influences on nectar secretion. By L. A. Kenoyer. Nov., 1916.
38. Fishiness in evaporated milk. By B. W. Hammer. Jan., 1917.
39. Carbon dioxide production in soils and carbon and nitrogen changes in soils variously treated. By R. S. Potter and R. S. Snyder. Feb., 1916 [i. e. 1917].
40. The relative influence of microorganisms and plant enzymes on corn silage fermentation. By A. R. Lamb. Mar., 1917.
41. A rapid volumetric method for approximate estimation of chlorine in milk. By B. W. Hammer and D. E. Bailey. June, 1917.
42. The occurrence and significance of mannitol in silage. By A. W. Dox and G. P. Plaisance. Dec., 1917.
43. Effect of sulfur and manure on availability of rock phosphate in soil. By P. E. Brown and A. R. Gwinn. Dec., 1917.
44. Effects of certain alkali salts on ammonification. By P. E. Brown and D. R. Johnson. Jan., 1918.
45. Soil inoculation with azotobacter. By Paul Emerson. Feb., 1918.
46. Composition and digestibility of Sudan grass hay. By W. G. Gaessler and A. C. McCandlish. Feb., 1918.
47. Studies on the clarification of milk, II. By B. W. Hammer and A. J. Hauser. Mar., 1918.
48. Milk as the sole diet of ruminants. By A. C. McCandlish. Aug., 1918.
49. Studies on the crown rust of oats. By I. E. Melhus and L. W. Durrell. Feb., 1919.
50. The effect of crown gall upon a young apple orchard. By Laurenz Greene and I. E. Melhus. Mar., 1919.
51. Appetite as a guide in feeding dairy calves. By A. C. McCandlish. Aug., 1919.
52. Studies on abnormal evaporated milk. By B. W. Hammer. Aug., 1919.
53. Studies on color in swine: I, The hereditary relationship of the black of the Hampshire and the red of the Duroc-Jersey. By Orren Lloyd-Jones and J. M. Evvard. Nov., 1919.
54. Studies on formation of gas in sweetened condensed milk. By B. W. Hammer. Sept., 1919.
55. The volatile acid production of starters and of organisms isolated from them. By B. W. Hammer and D. E. Bailey. Sept., 1919.
56. Effect of seasonal conditions and soil treatment on bacteria and molds in soil. By P. E. Brown and W. V. Halversen. Dec., 1919.
57. Relation of the barberry to stem rust in Iowa. By I. E. Melhus, L. W. Durrell, and R. S. Kirby. Jan., 1920.
58. Nitrification in acid soils. By R. E. Stephenson. Aug., 1920.
59. The fungicidal action of formaldehyde. By I. E. Melhus, J. C. Gilmen, and J. B. Kendrick. Aug., 1920.
60. Influence of condition on the maintenance requirements of dairy cattle. By A. C. McCandlish and W. G. Gaessler. Sept., 1920.
61. A study of lactose-fermenting yeasts present in "yeasty" cream. By B. W. Hammer and W. A. Cordes. Sept., 1920.
62. Comparative resistance of varieties of oats to crown and stem rusts. By L. W. Durrell and J. H. Parker. Oct., 1920.
63. Volatile acid production of *S. lacticus* and the organisms associated with it in starters. By B. W. Hammer. Oct., 1920.
64. A study of brown glass milk bottles, with special reference to their use in preventing abnormal flavors due to light. By B. W. Hammer and W. A. Cordes. Nov., 1920.
65. The type of lactic acid produced by starters and by the organisms isolated from them. By B. W. Hammer. Nov., 1920.

## SOIL SURVEY REPORTS.

1. Bremer County soils. By W. H. Stevenson, P. E. Brown, and F. B. Howe. Jan., 1917.
2. Pottawattamie County soils. By W. H. Stevenson, P. E. Brown, H. P. Hanson, and H. W. Reid. Jan., 1918.
3. Muscatine County. By W. H. Stevenson, P. E. Brown, and H. W. Johnson. Apr., 1918.
4. Webster County soils. By W. H. Stevenson, P. E. Brown, F. B. Howe, and G. E. Corson. July, 1918.
5. Lee County. By W. H. Stevenson, P. E. Brown, M. E. Sar, and G. E. Corson. Sept., 1918.
6. Sioux County. By W. H. Stevenson, P. E. Brown, G. E. Corson, and W. C. Bean. Nov., 1918.
7. Van Buren County soils. By W. H. Stevenson, P. E. Brown, G. E. Corson, and H. W. Reid. Dec., 1918.
8. Clinton County. By W. H. Stevenson, G. E. Corson, and F. B. Howe. Dec., 1918.
9. Scott County soils. By W. H. Stevenson, P. E. Brown, G. E. Corson, and Knute Espe. Jan., 1919.
10. Ringold County. By W. H. Stevenson, P. E. Brown, G. E. Corson, F. B. Howe, and M. E. Olson. Feb., 1919.
11. Mitchell County. By W. H. Stevenson, P. E. Brown, G. E. Corson, Knute Espe, and M. E. Olson. Feb., 1919.
12. Clay County. By W. H. Stevenson, P. E. Brown, G. E. Corson, T. H. Benton, and M. E. Olson. May, 1919.
13. Montgomery County. By W. H. Stevenson, P. E. Brown, G. E. Corson, M. E. Olson, and L. L. Rhodes. July, 1920.
14. Black Hawk County. By W. H. Stevenson, P. E. Brown, G. E. Corson, and H. J. Harper. July, 1920.

15. Henry County. By W. H. Stevenson, P. E. Brown, L. W. Forman, and T. H. Benton. Sept., 1920.  
 16. Buena Vista County soils. By W. H. Stevenson, P. E. Brown, L. W. Forman, and H. W. Warner. Oct., 1920.  
 17. Linn County. By W. H. Stevenson, P. E. Brown, L. W. Forman, and F. B. Howe. Dec., 1920.

## INDEXES.

Complete list of publications including Bulletins [1-182], Circulars [1-54], Press Bulletins [1-39], Research Bulletins [1-48], and Soil Survey Bulletins, [1-4], [and subject index]. Jan. 1, 1919.

## KANSAS.

## Kansas Agricultural Experiment Station, Manhattan.

1. Announcement [of organization and aims]. Apr., 1888.
2. Cultivated grasses and clovers in Kansas: Fourteen years' experience at the college farm. By E. M. Shelton. Apr., 1888.
3. Observations on two insect pests. By E. A. Popenoe. June, 1888.
4. Experiments with wheat. By E. M. Shelton. Sept., 1888.
5. Some comparisons of varieties of sorghum. By G. H. Failyer.—Preliminary report on sorghum blight. By W. A. Kellerman. Dec., 1888.
6. Silos and silage. By E. M. Shelton. June, 1889.
7. Experiments with wheat. By E. M. Shelton. July, 1889.
8. Preliminary report on smut in oats. By W. A. Kellerman and W. T. Swingle. Oct., 1889.
9. Experiments in pig-feeding. By E. M. Shelton and H. M. Cottrell. Dec., 1889.
10. Department of horticulture and entomology: Notes on conifers for Kansas planters. By E. A. Popenoe, S. C. Mason, and F. A. Marlatt. May, 1890.
11. Experiments with wheat. By C. C. Georgeson, H. M. Cottrell, and William Shelton. July, 1890.
12. Preliminary experiments with fungicides for stinking smut of wheat. By W. A. Kellerman and W. T. Swingle. Aug., 1889.
13. Experiments with oats. By C. C. Georgeson, H. M. Cottrell, and William Shelton. Aug., 1890.
14. Winter protection of peach trees and notes on grapes. By E. A. Popenoe, S. C. Mason, and F. A. Marlatt. Dec., 1890.
15. Additional experiments and observations on oat smut made in 1890. By W. A. Kellerman and W. T. Swingle. Dec., 1890.
16. Experiments with sorghum and sugar beets. By G. H. Failyer and J. T. Willard. Dec., 1890.
17. Crossed varieties of corn, second and third years. By W. A. Kellerman and W. T. Swingle. Dec., 1890.
18. Experiments with forage plants. By C. C. Georgeson, H. M. Cottrell, and William Shelton. Dec., 1890.
19. Germination of weeviled peas; garden notes on potatoes, beans, and cabbage. By E. A. Popenoe, S. C. Mason and F. A. Marlatt. Dec., 1890.
20. Experiments with wheat. By C. C. Georgeson, H. M. Cottrell, and William Shelton. July, 1891.
21. Second report on fungicides for stinking smut of wheat. By W. A. Kellerman. Aug., 1891.
22. Smut of oats in 1891; test of fungicides to prevent loose smut of wheat; spraying to prevent wheat rust. W. A. Kellerman. Aug., 1891.
23. Smuts of sorghum; corn smut. By W. A. Kellerman. Aug., 1891.
24. Enzootic cerebritis or "staggers" of horses. By N. S. Mayo. Sept., 1891.
25. Experiments with sorghum. By G. H. Failyer and J. T. Willard. Dec., 1891.
26. A comparison of varieties of the strawberry. By E. A. Popenoe and S. C. Mason. Dec., 1891.
27. Crossed varieties of corn, third year. By W. A. Kellerman and C. H. Thompson. Dec., 1891.
28. Second report on the experimental vineyard. By E. A. Popenoe and S. C. Mason. Dec., 1891.
29. Experiments with oats. By C. C. Georgeson, F. C. Burtis, and William Shelton. Dec., 1891.
30. Experiments with corn. By C. C. Georgeson, F. C. Burtis, and William Shelton. Dec., 1891.
31. Sugar beets. By G. H. Failyer and J. T. Willard. Dec., 1891.
32. Composition of some feeding stuffs; varying composition of certain plants during development. By G. H. Failyer and J. T. Willard.—Test of some Japanese beans; plaster and oil meal as fertilizers for millet; plaster on prairie grass; plaster on tame grass. By C. C. Georgeson, F. C. Burtis, and William Shelton. Dec., 1891.
33. Experiments with wheat. By C. C. Georgeson, F. C. Burtis, and William Shelton. Aug., 1892.
34. Experiments in feeding steers, [I]. By C. C. Georgeson, F. C. Burtis, and William Shelton. Sept., 1892.
35. *Actinomyces bovis*, or "lumpy jaw" of cattle; some observations upon loco. By N. S. Mayo. Dec., 1892.
36. Experiments with sorghum and sugar beets. By G. H. Failyer and J. T. Willard. Dec., 1892.
37. Experiments in potato culture. By E. A. Popenoe, S. C. Mason, and F. A. Marlatt. Dec., 1892.
38. Preliminary report on rusts of grain. By A. S. Hitchcock and M. A. Carleton. Mar., 1893.
39. Experiments in feeding steers, II. By C. C. Georgeson, F. C. Burtis, and D. H. Otis. Aug., 1893.
40. Experiments in wheat. By C. C. Georgeson, F. C. Burtis, and D. H. Otis. Aug., 1893.
41. The effect of fungicides upon the germination of corn. By A. S. Hitchcock and M. A. Carleton. Dec., 1893.
42. Experiments with oats. By C. C. Georgeson, F. C. Burtis, and D. H. Otis. Dec., 1893.
43. Experiments with sorghum and sugar beets. By G. H. Failyer and J. T. Willard. Dec., 1893.
44. Further study of native grapes. By E. A. Popenoe and S. C. Mason. Dec., 1893.
45. Experiments with corn. By C. C. Georgeson, F. C. Burtis, and D. H. Otis. Dec., 1893.
46. Rusts of grain, II. By A. S. Hitchcock and M. A. Carleton. May, 1894.
47. Experiments with wheat; experiments in feeding steers, III. By C. C. Georgeson, F. C. Burtis, and D. H. Otis. Aug., 1894.
48. Six years' experience with ensilage; some forage plants; renovating a prairie pasture. By C. C. Georgeson, F. C. Burtis, and D. H. Otis. Dec., 1894.
49. Cattle poisoning by potassium nitrate; mastitis. By N. S. Mayo. May, 1894.
50. Kansas weeds: I, Seedlings. By A. S. Hitchcock and J. B. S. Norton. June, 1895.
51. Steer feeding experiments: IV, A comparison between pure-bred shorthorns and scrubs. By C. C. Georgeson, F. C. Burtis, and D. H. Otis. June, 1895.
52. Kansas weeds: II, Preliminary circular on distribution. By A. S. Hitchcock and J. B. S. Norton. Sept., 1895.
53. Pig feeding experiments with corn, wheat, kaffir corn, and cottonseed. By C. C. Georgeson, F. C. Burtis, and D. H. Otis. Oct., 1895.
54. Experiments with oats. By C. C. Georgeson, F. C. Burtis, and D. H. Otis. Dec., 1895.

55. Small fruits culture by irrigation: Water supply storage and distribution; culture of the strawberry. By S. C. Mason, and F. C. Sears. Dec., 1895.
56. Experiments with corn; experiments with kafir corn. By C. C. Georgeson, F. C. Burtis, and D. H. Otis. Dec., 1895.
57. Kansas weeds: III, Descriptive list. By A. S. Hitchcock and J. B. S. Norton. June, 1896.
58. Cornstalk disease of cattle: Preliminary bulletin. By N. S. Mayo. June, 1896.
59. Experiments with wheat. By C. C. Georgeson, F. C. Burtis, and D. H. Otis. Aug., 1896.
60. Steer-feeding experiments, V. By C. C. Georgeson, F. C. Burtis, and D. H. Otis. Sept., 1896.
61. I, Kafir-corn, corn and soy-bean meal for pigs; II, kafir-corn and corn-meal for cattle. By C. C. Georgeson, F. C. Burtis, and D. H. Otis. Nov., 1896.
62. Corn smut. By A. S. Hitchcock and J. B. S. Norton. Dec., 1896.
63. Experiments with oats. By C. C. Georgeson, F. C. Burtis, and D. H. Otis. Dec., 1896.
64. Experiments with corn. By C. C. Georgeson, F. C. Burtis, and D. H. Otis. Mar., 1897.
65. Grafting the apple. By S. C. Mason and Isaac Jones. May, 1897.
66. Kansas weeds: IV, Fruits and seeds. By A. S. Hitchcock and G. L. Clothier. June, 1897.
67. Steer-feeding experiments, VI. By C. C. Georgeson, F. C. Burtis, and D. H. Otis. June, 1897.
68. Soil moisture. By G. H. Failyer and J. T. Willard. June, 1897.
69. Some diseases of cattle: Texas itch, blackleg, tuberculosis, Texas fever. By N. S. Mayo. June, 1897.
70. Vegetable growing. By S. C. Mason and W. L. Hall. July, 1897.
71. Experiments with wheat. By C. C. Georgeson, F. C. Burtis, and D. H. Otis. July, 1897.
- 72.<sup>5</sup> Growth of young stock. By C. C. Georgeson, F. C. Burtis, and D. H. Otis. July, 1897.
- 73.<sup>5</sup> Fruit notes. By S. C. Mason and W. L. Hall. July, 1897.
- 74.<sup>5</sup> Experiments with oats. By C. C. Georgeson, F. C. Burtis, and D. H. Otis. July, 1897.
- 75.<sup>5</sup> Root development of some forage plants. By C. C. Georgeson, and J. E. Payne. Aug., 1897.
76. Fifth report on Kansas weeds: Vegetative propagation of perennial weeds. By A. S. Hitchcock and G. L. Clothier. Feb., 1898.
77. Some insects injurious to the orchard. By E. E. Faville and P. J. Parrott. Mar., 1898.
78. Sugar beets. By J. T. Willard. Apr., 1898.
79. Horse tuberculosis. By Paul Fischer. Apr., 1898.
80. Sixth report on Kansas weeds: Distribution and other notes. By A. S. Hitchcock and G. L. Clothier. June, 1898.
81. Feed and care of the dairy cow. By H. M. Cottrell, F. C. Burtis, and D. H. Otis. Sept., 1898.
82. The potato-stalk weevil. By E. E. Faville and P. J. Parrott. Jan., 1899.
83. Sugar beets. By J. T. Willard and R. W. Clothier. Apr., 1899.
84. Cold storage for fruit. By E. E. Faville and W. L. Hall. Apr., 1899.
85. Investigations of the growth of alfalfa in Kansas. By G. L. Clothier.—Alfalfa feeding notes. By H. M. Cottrell. Apr., 1899.
86. Press bulletins 1-34. June, 1899.
87. Native agricultural grasses of Kansas. By A. S. Hitchcock and G. L. Clothier. Apr., 1899.
88. Keeping milk in summer. By H. M. Cottrell, F. C. Burtis, and D. H. Otis. May, 1899.
89. Soil moisture. By J. T. Willard and R. W. Clothier. June, 1899.
90. Alfalfa in eastern Kansas. By H. M. Cottrell, D. H. Otis, and J. G. Haney. Jan., 1900.
91. Swine plague. By Paul Fischer and A. T. Kinsley. Feb., 1900.
92. A new drought-resisting crop—soy beans. By H. M. Cottrell, D. H. Otis, and J. G. Haney. Mar., 1900.
93. Kafir-corn. By H. M. Cottrell, D. H. Otis, and J. G. Haney. Mar., 1900.
94. Sugar beets, 1899. By J. T. Willard and R. W. Clothier.—The station publications; partial index to station publications to Apr. 1, 1900. By J. T. Willard. Apr., 1900.
95. Fattening hogs with drought-resisting crops. By H. M. Cottrell, D. H. Otis, and J. G. Haney. Apr., 1900.
96. Soil inoculation for soy beans. By H. M. Cottrell, D. H. Otis, and J. G. Haney. May, 1900.
97. Skim milk calves. By H. M. Cottrell, D. H. Otis, and J. G. Haney. May, 1900.
98. Some scale insects upon Kansas grasses. By E. A. Popenoe and P. J. Parrott. May, 1900.
99. Press bulletins 35-70. Oct., 1900.
100. Soy beans in Kansas in 1900. By H. M. Cottrell, D. H. Otis, and J. G. Haney. Mar., 1901.
101. Notes from the plum orchard. By E. A. Popenoe and Albert Dickens. Jan., 1901.
102. Forage plants for Kansas. By A. S. Hitchcock and J. M. Westgate. Mar., 1901.
103. Digestion experiments with Kansas feeds; sugar beets, 1891-1900. By J. T. Willard and R. W. Clothier. June, 1901.
104. Fall seeding of alfalfa. By H. M. Cottrell. Aug., 1901.
105. Blackleg in Kansas. By Paul Fischer and A. T. Kinsley. Nov., 1901.
106. The experimental apple orchard. By Albert Dickens and G. O. Greene. Jan., 1902.
107. Analyses of corn, with reference to its improvement. By J. T. Willard, R. W. Clothier, and F. C. Weber. Apr., 1902.
108. The hardy catalpa: The catalpa as an economic tree. By H. F. Roberts.—The catalpa plantations at the agricultural college. By Albert Dickens. Apr., 1902.
109. Spontaneous combustion of alfalfa. By H. M. Cottrell. May, 1902.
110. Grapes. By Albert Dickens and G. O. Greene. May, 1902.
111. Quality in beef. By H. M. Cottrell and V. M. Shoemith. May, 1902.
112. Fattening steers without hogs to follow. By H. M. Cottrell and J. G. Haney. June, 1902.
113. Baby beef. By H. M. Cottrell, J. G. Haney, and O. H. Elling. June, 1902.
114. Growing alfalfa in Kansas. By H. M. Cottrell. June, 1902.
115. The exact calculation of balanced rations. By J. T. Willard. Dec., 1902.
116. Destroying prairie dogs and pocket gophers. By D. E. Lantz. Jan., 1903.
117. Bacteria of the soil. By N. S. Mayo and A. T. Kinsley. May, 1903.
118. Flesh and fat in beef. By D. H. Otis. May, 1903.
119. Press bulletins 71-124. Sept., 1903.
120. Tests of forest trees. By Albert Dickens and G. O. Greene. Jan., 1904.
121. Treatment and utilization of flood-damaged lands: [Renewing washed and sanded lands. By A. M. Ten Eyck.—Sand-binding grasses. By H. F. Roberts.—Trees for the sanded areas. By Albert Dickens.] Jan., 1904.
122. Blackleg and vaccination. By N. S. Mayo and C. L. Barnes. Feb., 1904.
123. Crop experiments in 1903. By A. M. Ten Eyck and V. M. Shoemith. Mar., 1904.
124. Experiments in feeding steers and in breeding and feeding pigs. By D. H. Otis. Mar., 1904.
125. Experiments with dairy cows. By D. H. Otis. May, 1904.

<sup>5</sup> Buls. 72-75 were issued under one cover with the Annual Report for 1897 and an index to publications for the year.

126. Experiments with hand-fed calves. By D. H. Otis. May, 1904.
127. The roots of plants. By A. M. Ten Eyck. June, 1904.
128. Fort Hays Branch experiments, 1902-1904. Dec., 1904.
129. Kansas mammals in their relation to agriculture. By D. E. Lantz. Dec., 1904.
130. Steer feeding experiment, VII, 1903-4. By Oscar Erf, R. J. Kinzer, and G. C. Wheeler. Apr., 1905.
131. Care of dairy utensils. By Oscar Erf and C. W. Melick. Apr., 1905.
132. Western feeds for beef production. By J. G. Haney, O. H. Elling, and G. K. Helder. Jan., 1906.
133. Alfalfa seed: Its adulterants, substitutes, and impurities, and their detection. By H. F. Roberts and G. F. Freeman. Feb., 1906.
134. The alfalfa seed-crop and seeding alfalfa. By A. M. Ten Eyck. Mar., 1906.
135. Grading cream. By Oscar Erf. May, 1906.
136. Press bulletins 125-151. June, 1906.
137. Variations in the test of separator creams. By C. W. Melick. June, 1906.
138. Effect of bacteria in wash water of butter. By C. W. Melick. June, 1906.
139. The study of corn. By V. M. Shoemsmith. June, 1906. Revised reprint, Oct., 1907.
140. Milking machines. By Oscar Erf. Oct., 1906.
141. Commercial seeds of brome grass and of English and Kentucky blue grasses; adulterants and substitutes and their detection. By H. F. Roberts and G. F. Freeman. Jan., 1907.
142. The value of oil in road improvement. By Albert Dickens. Jan., 1907.
143. Disposal of dairy and farm sewage, and water supply. By Oscar Erf. Feb., 1907.
144. Small-grain crops. By A. M. Ten Eyck and V. M. Shoemsmith. Mar., 1907.
145. Spraying. By Albert Dickens and R. E. Eastman. Apr., 1907.
146. Kansas law regulating the sale of concentrated feeding stuffs. By C. W. Burkett and J. T. Willard. May, 1907.
147. Indian corn. By A. M. Ten Eyck and V. M. Shoemsmith. June, 1907.
148. Kansas law regulating the sale of commercial fertilizers. By C. W. Burkett and J. T. Willard. July, 1907.
149. Prevention of sorghum and kafir-corn smut. By H. F. Roberts and G. F. Freeman. July, 1907.
150. The hen's place on the farm. By Oscar Erf. Oct., 1907.
151. Alfalfa breeding: Materials and methods. By H. F. Roberts and G. F. Freeman. Dec., 1907 [i. e. 1908].
152. The pocket gopher. By T. H. Scheffer. Feb., 1908. See 172.
153. Deterioration of red Texas oats in Kansas. By H. F. Roberts and G. F. Freeman. Mar., 1908.
154. The mound-building prairie ant. By T. J. Headlee and G. A. Dean. Apr., 1908.
155. Alfalfa. By G. F. Freeman [and others]. June, 1908.
156. The yellow berry problem in Kansas hard winter wheats. By H. F. Roberts and G. F. Freeman. Oct. 1908.
157. Studies on hog cholera and preventive treatment. By W. E. King. Nov., 1908.
158. Analyses of registered feeding stuffs. By J. T. Willard [and others]. Mar., 1909.
159. Analyses of eggs. By J. T. Willard and R. H. Shaw. Mar., 1909.
160. Cow peas. By A. M. Ten Eyck and L. E. Call. Apr., 1909. Second edition, Jan., 1910.
161. The influence of depth of cultivation upon soil bacteria and their activities. By W. E. King and C. J. T. Doryland. Aug., 1909.
162. The marketing of eggs. By A. G. Phillips. Dec., 1909.
163. Hog cholera and vaccination. By F. S. Schoenleber. Jan., 1910.
164. The selection and feeding of laying hens. By A. G. Phillips. Jan., 1910.
165. Report of state forester upon forest conditions in central and western Kansas. By Albert Dickens. Mar., 1910.
166. Spring grains. By A. M. Ten Eyck. Mar. 24, 1910.
167. A quantitative method for the determination of hardness in wheat. By H. F. Roberts. Mar. 15, 1910.
168. The common mole. By T. H. Scheffer. Aug. 1, 1910.
169. Fertilizers and their use. By J. T. Willard, C. O. Swanson, and R. C. Wiley. Sept. 19, 1910.
170. Breeding for type of kernel in wheat, and its relation to the grading and milling of the grain. By H. F. Roberts. Sept. 19, 1910.
171. Studies on hog cholera and preventive treatment. By W. E. King and R. H. Wilson. Sept., 1910.
172. The pocket gopher. By T. H. Scheffer. Sept. 3, 1910. A revision of 152.
173. Meningo-encephalitis (blind staggers). By T. P. Haslam. Sept., 1910.
174. Spraying the apple orchard. By Albert Dickens and T. J. Headlee. Jan., 1911.
175. Grasses. By A. M. Ten Eyck. Jan. 24, 1911.
176. How to grow wheat in Kansas. By W. M. Jardine and L. E. Call. July, 1911.
177. Milling tests of wheat and baking tests of flour. By J. T. Willard and C. O. Swanson. Aug., 1911.
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8. Bacteriological studies of methods of preparing a seedbed for wheat. By P. L. Gainey. Oct., 1920.

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216. Strawberries. By A. J. Olney and C. W. Mathews. Apr., 1918.
217. Profitable dairy-farm organization in Kentucky. By W. D. Nicholls and J. B. Hutson. July, 1918.
218. Some experiments with tomatoes. By A. J. Olney. Dec. 30, 1918.
219. Commercial Fertilizers. By H. E. Curtis and William Rodes. Dec. 31, 1918.
220. The effect of certain grain rations on the growth of the White Leghorn chick and their influence on subsequent egg production. (Research bulletin.) By C. D. Buckner, A. M. Peter, R. H. Wilkins, and J. J. Hooper. Mar. 29, 1919.
221. Marketing hemp. By J. R. Humphrey. June 27, 1919.
222. Tractor experience in Kentucky. By W. D. Nicholls. Sept., 1919.
223. Feeds and their use: Inspection and analyses. By J. D. Turner, H. D. Speare, and A. M. Peter. Oct., 1919.
224. Commercial fertilizers. By H. E. Curtis, William Rodes, and H. R. Allen. Dec., 1919.
225. The broods of the tobacco worms. (Research bulletin.) By Harrison Garman and H. H. Jewett. Mar., 1920.
226. Seed-corn infection with *Fusarium moniliforme* and its relation to the root and stalk rots. (Research bulletin.) By W. D. Valleau. May 1, 1920.
227. Observations on the structure and coloration of the larval corn-ear worm (*Chloridea obsoleta*), the bud worm (*C. virescens*) and a few other lepidopterous larvae. (Research bulletin.) By Harrison Garman. May, 1920.
228. Report on soil experiment fields; maintenance of fertility. By George Roberts and A. E. Ewan. July 1, 1920.



229. The cost of producing tobacco in Kentucky, preliminary report. By W. D. Nicholls and F. W. Peck. Oct., 1920.
230. Analyses of commercial fertilizers. By H. E. Curtis, H. R. Allen, and R. H. Ridgell. Dec. 31, 1920.

## LOUISIANA.

- No. 1. Sugar Experiment Station, Audubon Park, New Orleans.  
 No. 2. State Experiment Station, Baton Rouge.  
 No. 3. North Louisiana Experiment Station, Calhoun.  
 No. 4. Rice Experiment Station, Crowley.

## BULLETINS [FIRST SERIES].

1. What has been done; what the station contemplates doing. By W. C. Stubbs. [n. d.]
2. [Fertilizers.] By W. C. Stubbs. [1886.]
3. [Summary of the work of the Sugar Experiment Station from its organization, Oct., 1885, to Apr., 1886.] By W. C. Stubbs.—Record of weather for March. By J. D. Stubbs. Apr., 1886.
4. [Oats.] By W. C. Stubbs. [July], 1886.
5. Sorghum. By W. C. Stubbs. Dec., 1886.
6. Corn. By W. C. Stubbs. Dec., 1886.
7. Sugar cane: Field experiments. By W. C. Stubbs. Jan., 1887.
8. Cotton. By W. C. Stubbs. 1887.
9. Analyses and valuation of fertilizers. By W. C. Stubbs. May, 1887.
10. Sugar cane: Sugar house and laboratory experiments, 1886. By W. C. Stubbs. 1887
11. Oats and potatoes. By W. C. Stubbs. 1887.
12. Sorghum. By W. C. Stubbs. Jan., 1888.
13. Cotton and its products. By W. C. Stubbs. [1888?]
14. Sugar cane: Field experiments. By W. C. Stubbs. Jan., 1888.
15. Rice. By W. C. Stubbs and H. S. Wilkinson. 1888. See 24.
16. Potatoes, tomatoes, peas, and small grains. By D. N. Barrow. 1888.
17. Enslage. By W. C. Stubbs and B. B. Ross. 1888.
18. Analyses of commercial fertilizers. By W. C. Stubbs. 1888.
19. Sorghum: Field, laboratory, and sugar house results; diffusion process. By W. C. Stubbs. Dec., 1888.
20. Sugar cane: Field experiments. By W. C. Stubbs. Jan., 1889.
21. Report of the State experiment station for 1888. Jan., 1889.
22. Annual report of the North Louisiana Experiment Station, 1888. By W. C. Stubbs. Jan., 1889.
23. Sugar cane: Laboratory and sugarhouse results; diffusion process. By W. C. Stubbs. 1889.
24. Rice and its by-products. By B. B. Ross and W. C. Stubbs. n. d. See 77, second series.
25. Analyses of commercial fertilizers and other substances useful to agriculture. By W. C. Stubbs. 1888.
26. Report of the State Experiment Station for 1889. By W. C. Stubbs. Jan., 1890.
27. Report of the North Louisiana Experiment Station for 1889. By J. G. Lee. [1890?]
28. Report of the Sugar Experiment Station: Field experiments. By W. C. Stubbs. 1890.

BULLETINS, SECOND SERIES.<sup>6</sup>

1. Analyses of commercial fertilizers and other substances useful to agriculture. By W. C. Stubbs. 1890.
2. Texas screw worm, *Comptosmia (Lucilia) macellaria*. By H. A. Morgan. 1890.
3. Report of Horticultural Department. By H. A. Morgan and J. G. Lee. 1890.
4. Irish potatoes. By W. C. Stubbs, H. A. Morgan, and J. G. Lee. 1890.
5. Sugar making on a small scale with results at the North Louisiana Experiment Station. By W. C. Stubbs. 1891. Reprint, with additions, 1895. Revised reprint, 1902.
6. Results of field experiments with sugar cane. By W. C. Stubbs. 1891.
7. Report of the State Experiment Station for 1890. 1891.
8. Results of 1890 obtained on the North Louisiana Experiment Station. By J. G. Lee. 1891.
9. Sugar cane borer [*Chilo saccharalis*] and its parasite. By H. A. Morgan. 1891.
10. Systematic feeding of work stock a preventive of disease and some of the diseases of farm animals. By W. H. Dalrymple. 1891.
11. Report of the sugarhouse and laboratory for 1890. By W. C. Stubbs. 1891.
12. Analyses of commercial fertilizers and other substances useful to agriculture. By W. C. Stubbs. 1891.
13. Sweet potatoes. H. A. Morgan and B. B. Ross. 1892.
14. Sugar cane: Field and laboratory results of 1891. By W. C. Stubbs. 1892.
15. Report of veterinarian, 1891. By W. H. Dalrymple. 1892.
16. Results of 1891 obtained on the North Louisiana Experiment Station. By J. G. Lee. 1892.
17. Results of 1891 obtained on the State Experiment Station. By D. N. Barrow. 1892.
18. Analyses of commercial fertilizers and other substances useful to agriculture. By W. C. Stubbs. 1892.
19. Forage crops, grasses, clovers, and small grains. By W. C. Stubbs. 1892.
20. Tobacco growing in Louisiana, with results of experiments at Calhoun. By W. C. Stubbs and J. G. Lee. 1893.
21. Report of results for 1892 at Calhoun. By J. G. Lee. 1893.
22. Results of the year 1892, [State Station]. By W. C. Stubbs [and others]. 1893.
23. Analyses of commercial fertilizers and other substances useful to agriculture. By W. C. Stubbs. 1893.
24. Sugar cane: Field experiments, physical and physiological. By W. C. Stubbs. 1894.
25. Tobacco. By J. G. Lee and W. C. Stubbs. 1894.
26. Sugar cane: Field experiments, varieties of cane, and striped versus purple. By W. C. Stubbs. 1894.
27. Horticulture: Results of the year 1893. By F. H. Burnette, Eugene Watson, and W. C. Stubbs. 1894.
28. Report of the farm [State Station]. 1893. By D. N. Barrow.—Report of the veterinarian [State Station]. By S. B. Staples.—Report of the entomologist [State Station]. By H. A. Morgan. 1894.
29. Report of results for 1893 at Calhoun, La. By J. G. Lee. 1894.
30. Sweet potatoes. By F. H. Burnette. 1894.
31. Domestic and commercial fertilizers: Results of five years with our staple crops. By W. C. Stubbs. 1894.
32. Ramie (*Boehmeria nivea*). By W. C. Stubbs. 1895.
33. Tobacco. By J. G. Lee. 1895.
34. Cattle feeding, with results of trials. By W. C. Stubbs and D. N. Barrow. 1895.

<sup>6</sup> The designation "Second series" was dropped after Bul. 83.

35. Report for 1894 [North Louisiana Experiment Station]. By J. G. Lee. 1895.
36. Horticulture: Results of the year 1894. By W. C. Stubbs, F. H. Burnette, and Eugene Watson. 1895.
37. Windrowed versus standing canes. By W. C. Stubbs. 1895.
38. The chemistry of sugar cane and its products. By G. C. Taylor, J. L. Beeson, and W. Maxwell. 1895.
39. Analyses of commercial fertilizers. By W. C. Stubbs. 1895.
40. Cowpea. By W. C. Stubbs, W. R. Dodson, and Maurice Bird. 1896.
41. Tobacco. Yellow leaf and cigar varieties. By J. G. Lee and D. N. Barrow. 1896.
42. Horticulture: Results of the year 1895. By [F. H. Burnette, Eugene Watson, and W. C. Stubbs]. 1896.
43. Bovine tuberculosis in north Louisiana. By [W. C. Stubbs], S. B. Staples, and W. H. Dalrymple. 1896.
44. Charbon, or anthrax. By S. B. Staples and W. H. Dalrymple. 1896.
45. Analyses of commercial fertilizers and Paris green. By [W. C. Stubbs.] 1896.
46. Leguminous root tubercles. By W. R. Dodson. 1897.
47. Results of experiments at State experiment station, Baton Rouge, La., in corn, cotton, forage crops, tobacco, etc. By D. N. Barrow. 1897.
48. Report of the entomologist. By H. A. Morgan. 1897.
49. Analyses of commercial fertilizers and Paris green. By W. C. Stubbs. 1897.
50. Red rice. By W. R. Dodson. 1898.
51. Cattle tick and Texas fever. By W. H. Dalrymple, H. A. Morgan, and W. R. Dodson. 1898.
52. Report for 1896 and 1897 of the horticultural department of State experiment stations. By W. C. Stubbs, F. H. Burnette, and Eugene Watson. 1898.
53. Grasses, clovers, forage, and economic crops. By W. R. Dodson and W. C. Stubbs. 1898.
54. Analyses of commercial fertilizers and Paris green. By W. C. Stubbs. 1898.
55. Alfalfa, Spanish peanuts, Unknown cowpea, and velvet beans. By W. C. Stubbs. 1899.
56. Ticks and Texas fever. By H. A. Morgan. 1899.
57. Immunization against Texas fever by blood inoculation. By W. R. Dodson, W. H. Dalrymple, and H. A. Morgan. 1899.
58. Analyses of commercial fertilizers and Paris green. By W. C. Stubbs and W. T. Jones. 1899.
59. Sugar cane: Field and laboratory results for ten years. By W. C. Stubbs. 1900.
60. Charbon. Further investigation and suggestions with summary and conclusions. By W. H. Dalrymple. 1900.
61. Rice: Preparation, cultivation, flooding, and harvesting. By W. C. Stubbs.—Noxious weeds in the rice fields. By W. R. Dodson. 1900. See 77.
62. Report of results for 1899 at Calhoun. By J. G. Lee. 1900.
63. Analyses of commercial fertilizers and Paris green. By W. C. Stubbs.—Inspection of fertilizers and Paris green, season of 1899-1900. Sept., 1900.
64. Report of the veterinarian. By W. H. Dalrymple. 1901.
65. Analyses of commercial fertilizers and Paris green. By W. C. Stubbs and C. H. O'Rourke. 1901.
66. Sugar cane: Experiments in cultivation. By W. C. Stubbs. 1901.
67. Broom corn: How to grow and cure it. By W. R. Dodson. 1902.
68. Home-grown vs. purchased seed. By W. C. Stubbs, F. H. Burnette, and Eugene Watson. 1902.
69. Pecans. By F. H. Burnette, W. C. Stubbs, and H. A. Morgan. 1902.
70. Cane borer (*Diatroea saccharalis*). By W. C. Stubbs and H. A. Morgan. 1902.
71. Report [of North Louisiana Experiment Station], 1901. By D. N. Barrow. 1902.
72. Forage crops, grasses, alfalfa, clovers, etc. By W. R. Dodson. 1902.
73. Analyses of commercial fertilizers and Paris green. By W. C. Stubbs [and others]. 1902.
74. Sheep. By W. H. Dalrymple. 1903.
75. Preservation of cane sirup. By W. R. Dodson.—The enzymes of the sugar cane. By C. A. Browne, jr.—Special device for keeping sirup in a sterile condition: relation of bacteria to the inversion of crystallized sugars. By W. R. Dodson. 1903.
76. Analyses of commercial fertilizers and Paris green. By W. C. Stubbs.—[Report covering seventeen years of work of the inspection of commercial fertilizers under the supervision of the Louisiana State Board of Agriculture and Immigration from 1886 to 1903.] By C. H. O'Rourke. 1903.
77. Rice. By W. C. Stubbs, W. R. Dodson, and C. A. Browne, jr. 1904. Supersedes 15 and 24, first series, and 61. See 172.
78. Comparative results of seedling sugar canes, D. 74 and D. 95 with our home sugar canes (Louisiana striped and Louisiana purple). By W. C. Stubbs and R. E. Blouin. [1904?]
79. Results of experiments with nodule-disease of the intestines of sheep. By W. H. Dalrymple. Apr., 1904.
80. Analyses of commercial fertilizers and Paris green. By W. C. Stubbs.—Annual fertilizer report for the season 1903-4. By C. H. O'Rourke. [1905.]
81. Results of experiments in production and marketing fruits and vegetables, and canning fruits and vegetables on a small scale, at the North Louisiana Experiment Station, Calhoun, La. By D. N. Barrow and E. J. Watson. 1905.
82. The Texas fever cattle tick situation, and the eradication of the tick by a pasture rotation system. By H. A. Morgan. 1905.
83. Results of further experiment with nodule disease of the intestines of sheep: "Bare-lot" method of raising lambs. By W. H. Dalrymple. 1905.
84. Texas fever. By W. H. Dalrymple. Oct., 1905.
85. Black-leg. By W. H. Dalrymple. Mar., 1906.
86. Our available stock foods. By W. H. Dalrymple. Aug., 1906.
87. Analyses of commercial fertilizers and Paris green. By J. E. Halligan [and others]. Sept., 1906.
88. Analyses of commercial feeding stuffs. By J. E. Halligan [and others]. Sept., 1906.
89. Nodule disease of the intestines of sheep: "Bare-lot" method of raising lambs, results of further experimental work. By W. H. Dalrymple. Dec., 1906.
90. Summary of results with vegetables and fruits at the North Louisiana Experiment Station from 1892 to 1907. By E. J. Watson. Jan., 1907.
91. The chemistry of the sugar cane and its products in Louisiana. By C. A. Browne, jr., and R. E. Blouin. 1907.
92. Experiments in the late planting of cotton to avoid boll weevil damage during 1906. By C. W. Flynn, jr. May, 1907.
- 93.<sup>7</sup> Second report upon the horseflies of Louisiana. By J. S. Hine. June, 1907.  
P. E. Archinard, and J. A. Hall, jr. July, 1907.

<sup>7</sup> First report was published concurrently as Circ. 6 of the Louisiana Crop Pest Commission and Bul. 5 of the Gulf Biologic Station.

94. The effects on the human system of Louisiana manufactured sirups and molasses. By R. E. Blouin, P. E. Archinard, and J. A. Hall, jr. July, 1907.
95. Bare lot versus grass lot in relation to stomachal and intestinal parasitism of lambs—further experiments. By W. H. Dalrymple. Sept., 1907.
96. Cotton wilt. By H. R. Fulton. Sept., 1907.
97. Analyses of commercial fertilizers and Paris green. By J. E. Halligan [and others]. Sept., 1907.
98. Analyses of commercial feeding stuffs. By J. E. Halligan [and others]. Sept., 1907.
99. Japanese persimmons. By F. H. Burnette. Dec., 1907.
100. The root disease of sugar cane. By H. R. Fulton. Jan., 1908.
101. Diseases of pepper and beans. By H. R. Fulton. Jan., 1908.
102. Report of dairy herds and their milk production at Hammond, La., and vicinity. By T. E. Woodward and J. G. Lee, jr. Mar., 1908.
103. Investigations on the use of sulphur and its combinations in the sugar house. By F. Zerban. Mar., 1908.
104. Feeding "blackstrap" molasses to young calves. By T. E. Woodward and J. G. Lee, jr. Mar., 1908.
105. Diseases affecting rice in Louisiana. By H. R. Fulton. Apr., 1908.
106. A preliminary report on the so-called cerebro-spinal meningitis of horses. By H. K. Milks. July, 1908.
107. Preliminary tests of sugar house machinery. By E. W. Kerr. 1908.
108. A preliminary report on some diseases of chickens. By H. J. Milks. Aug., 1908.
109. Experiments with *Bacterium anthracis*, anthrax vaccines and hyperimmunization. By H. J. Milks. Aug., 1908.
110. Comparison of cottonseed meal and hulls with cold pressed cake as a dairy feed. By J. G. Lee and J. E. Woodward. Sept., 1908.
111. Rotation experiments with cotton, corn, cowpeas, and oats. By W. R. Dodson. Sept., 1908.
112. Orchard report of Baton Rouge Station. Oct., 1908.
113. Analyses of commercial fertilizers and Paris green. By J. E. Halligan [and others]. Sept., 1908.
114. Analyses of commercial feeding stuffs. By J. E. Halligan [and others]. Sept., 1908.
115. The principles and practice of feeding, including our available stock foods. By W. H. Dalrymple. May, 1909. Superseded by 148.
116. Preliminary report on the anthracnose or pod spot disease of beans. By C. W. Edgerton. June, 1909.
117. An experimental study of bagasse and bagasse furnaces. By E. W. Kerr and E. M. Percy. Aug., 1909.
118. Corn. By W. R. Dodson and V. L. Roy. Aug., 1909.
119. The bean anthracnose. By C. W. Edgerton. Apr., 1910.
120. Some sugar-cane diseases. By C. W. Edgerton. July, 1910.
121. A preliminary report on the sugar-cane mealy-bug (*Pseudococcus calceolariae* Mask.). By J. B. Garrett. July, 1910.
122. Rough rice as feed for horses and mules. By W. H. Dalrymple. July, 1910.
123. Some experiments in grazing and soiling. By S. E. McClendon. Oct., 1910.
124. Pt. I, Breeds of hogs. By W. H. Dalrymple.—Pt. II, The best crops to grow for hogs, and other data. By W. R. Dodson.—Portable fences. By S. E. McClendon. Nov., 1910.
125. The bacterial deterioration of sugars. By W. L. Owen. Jan., 1911.
126. Diseases of the fig tree and fruit. By C. W. Edgerton. Mar., 1911.
127. Sugar cane seedlings. By H. P. Agee. May, 1911.
128. Bagasse drying. By E. W. Kerr and H. A. Nadler. June, 1911.
129. Cane sirup making. By H. P. Agee. July, 1911.
130. Lespedeza or Japan clover. By W. R. Dodson [and others]. Sept., 1911.
131. Experiments with oil burning in boiler furnaces. By E. W. Kerr and H. A. Nadler. Sept., 1911.
132. A simple, effective, and inexpensive method of treating the arsenical dipping solution before emptying vat for cleaning. By W. H. Dalrymple and A. P. Kerr. Oct., 1911.
133. The red rot of sugar cane. A report of progress. By C. W. Edgerton. Dec., 1911.
134. Some studies on cotton-seed meal poisoning. By C. W. Edgerton and Harry Morris. Mar., 1912.
135. Investigations on methods of analysis of cane products. By W. E. Cross. Dec., 1912.
136. Carrion feeders as disseminators of anthrax or charbon. By Harry Morris and W. H. Dalrymple.
137. The rots of the cotton boll. By C. W. Edgerton. Dec., 1912.
138. An experimental study of heat transmission and entrainment in a vacuum evaporator. (Progress report.) By E. W. Kerr and A. J. Isaacs. Jan., 1913.
139. The bean blight and preservation and treatment of bean seed. By C. W. Edgerton and C. C. Moreland. Jan., 1913.
140. Preliminary report on winter cauliflower. By G. L. Tiebout. May, 1913.
141. Vegetable culture in north Louisiana. By E. J. Watson. July, 1913.
142. Diseases of the tomato in Louisiana. By C. W. Edgerton and C. C. Moreland. Oct., 1913. Abridged form, Apr., 1914.
143. Silos and ensilage. By W. R. Dodson and C. H. Staples. Mar., 1914.
144. Clarification of Louisiana cane juices. By W. E. Cross. Apr., 1914.
145. Suppression of the cottony cushion scale in Louisiana. By E. S. Tucker. Apr., 1914.
146. Bacteriological investigations of sugar cane products. By W. L. Owen. May, 1914.
147. Paille fine grass. By S. M. Tracy. May, 1914.
148. Stock feeding. By W. H. Dalrymple. May, 1914. Supersedes 115.
149. Performance tests of sugar house heating and evaporating apparatus. By E. W. Kerr, J. F. Gunther, and W. A. Rolston. Aug., 1914.
150. Citrus canker. By C. W. Edgerton. Oct., 1914.
151. Cattle feeding on the plantation and farm. By W. H. Dalrymple. Jan., 1915.
152. Anthrax or charbon: Points of popular interest. By Harry Morris. Feb., 1915.
153. The comparative value of various germicides for use in cane sugar factories. By W. L. Owen. Feb., 1915.
154. Protecting cabbage and cauliflower from attacks by worms. By E. S. Tucker. June, 1915.
155. Experiments on varietal resistance to the bean and cotton anthracnose diseases. By C. W. Edgerton and C. C. Moreland. Mar., 1916.
156. The direct determination of sucrose in the presence of reducing sugars. By M. A. Schneller. July, 1916.
157. The coloring matter of cane juices. A preliminary report. By M. A. Schneller. Aug., 1916.
158. Tests of the power and steam consumption of sugar factories. By E. W. Kerr, W. A. Rolston, and S. J. Webre. Sept., 1916.
159. Experimental studies of vacuum juice heaters. By E. W. Kerr and S. J. Webre. Sept., 1916.
150. [i. e. 160]. Tests of boilers with bagasse as fuel. By E. W. Kerr. Oct., 1916.
161. Vegetable decolorizing carbons and their use in the cane sugar industry. By F. W. Zerban. Feb., 1918.
162. The deterioration of cane sugars in storage; its causes and suggested measures for its control. By W. L. Owen. Mar., 1918.
163. Blood-sucking insects as transmitters of anthrax or charbon. By Harry Morris. Mar., 1918.

164. Delayed ripening of tomatoes caused by spraying with Bordeaux mixture. By C. W. Edgerton. Sept., 1918.
165. The color of sugar-cane products and decolorization in factory practice. By F. W. Zerban and E. C. Freeland. Mar., 1919.
166. The deterioration of cane sugar by fungi. By Nicholas Kopeloff and Lillian Kopeloff. Feb., 1919.
167. Studies on the preparation of vegetable decolorizing carbons for the cane sugar industry. By F. W. Zerban, E. C. Freeland, and D. D. Sullivan. May, 1919.
168. Anthrax: Transmission of infection by nonbiting flies. By Harry Morris. May, 1919.
169. Effect of fungi on the germination of sugar cane. By C. W. Edgerton and C. C. Moreland. Jan., 1920.
170. Factors determining the keeping quality of cane sugar (with a chart for prediction). By Nicholas Kopeloff and Lillian Kopeloff. July, 1920.
171. The amount of salt in irrigation water injurious to rice. By F. C. Quereau. July, 1920.
172. Rice investigations. By F. C. Quereau. Sept., 1920. A revision of 77.
173. The clarification of cane juice without chemical treatment. By F. W. Zerban. Mar., 1920.
174. Tomato wilt. By C. W. Edgerton and C. C. Moreland. Apr., 1920.
175. The prevention of sugar deterioration. By Nicholas Kopeloff, C. J. Welcome, and Lillian Kopeloff. Sept., 1920.
176. A method of selecting L 511 cane free of the mosaic disease for planting purposes. By C. W. Edgerton. Sept., 1920.
177. Chemical composition of some Louisiana soils as to series and texture. By S. S. Walker. Aug., 1920.

## SPECIAL BULLETIN.

The orange and other citrus fruits from seed to market, with insects beneficial and injurious, with remedies for the latter. By W. C. Stubbs and H. A. Morgan. 1893.

## GEOLOGY AND AGRICULTURE.

- I. A preliminary report upon the hills of Louisiana north of the Vicksburg, Shreveport & Pacific Railroad. By O. Lerch. 1892.
- II. A preliminary report upon the hills of Louisiana south of the Vicksburg, Shreveport & Pacific Railroad. By O. Lerch. 1893.
- III. A preliminary report upon the Florida parishes of east Louisiana and the bluff, prairie, and hill lands of southwest Louisiana. By W. W. Clendenin and W. R. Dodson. [1896.]
- IV. A preliminary report upon the bluff and Mississippi alluvial lands of Louisiana. By W. W. Clendenin and W. R. Dodson. [1896.]
- V. A preliminary report on the geology of Louisiana. By G. D. Harris [and others]. 1899.
- VI. A report on the geology of Louisiana, containing special papers by different authors. By G. D. Harris [and others]. 1902.

GEOLOGICAL SURVEY BULLETINS.<sup>8</sup>

1. A report on the underground waters of Louisiana. By G. D. Harris [and others]. 1905.
2. A report on terrestrial magnetism and meridian line work in Louisiana. By L. A. Bauer [and others]. 1905.
3. A report on the establishment of tide gage work in Louisiana. By G. D. Harris. 1905.
4. Geology and underground water resources of northern Louisiana with notes on adjoining districts. By A. C. Veatch. 1906.
5. Notes on the geology of the Winnfield sheet. By G. D. Harris. 1907.
6. Cartography of southwestern Louisiana with special reference to the Jennings sheet. By G. D. Harris. 1907.
7. Rock salt, its origin, geological occurrences and economic importance in the State of Louisiana. By G. D. Harris, C. J. Mairy, and L. Reinecke. 1908.
8. Oil and gas in northwestern Louisiana with special reference to the Caddo field. By G. D. Harris, I. Perrine, and W. E. Hopper. 1909.

## MAINE.

## Maine Agricultural Experiment Station, Orono.

BULLETINS (FIRST SERIES).<sup>9</sup>

1. Analyses and valuation of commercial fertilizers. By Walter Balentine. May, 1885.
2. Remarks on valuation of commercial fertilizers. By W. H. Jordan. Aug., 1885.
3. Analyses of wood ashes from various sources. [1885?]
4. Analyses of harbor mud and wood ashes. By W. H. Jordan. Dec., 1885.
5. Examination of condimental cattle foods. By W. H. Jordan. Jan., 1886.
6. The valuation of fertilizers. By W. H. Jordan. Apr., 1886.
7. [Analyses and valuations of fertilizers]. By W. H. Jordan. Apr., 1886.
8. [Analyses and valuations of fertilizers]. By W. H. Jordan. May, 1886.
9. [Fertilizers analyzed in 1886]. By W. H. Jordan. July, 1886.
10. [Analyses of molasses]. By W. H. Jordan. Oct., 1886.
11. [Plan of field experiments with fertilizers]. By W. H. Jordan. Oct., 1886.
12. The comparative production from different forms of phosphoric acid. By W. H. Jordan. Oct., 1886.
13. [Experiments with fertilizers]. By W. H. Jordan. Oct., 1886.
14. [Analyses of Paris green, London purple, Hammond's slug shot]. By W. H. Jordan. Jan., 1887.
15. [Experiments with foods for poultry]. By W. H. Jordan. Feb., 1887.
16. [Relative value of cottonseed meal and linseed meal for feeding purposes]. By W. H. Jordan. Feb., 1887.
17. [Analyses of clam shells; Bowker's fine ground bone]. By W. H. Jordan. Mar., 1887.
18. Potatoes; oats; barley. By W. H. Jordan. Apr., 1887.
19. [Analyses and valuations of fertilizers]. By W. H. Jordan. Apr., 1887.
20. [Analyses and valuations of fertilizers]. By W. H. Jordan. May, 1887.
21. The condition of the station; distribution of bulletins and reports. By W. H. Jordan. Dec., 1887.
22. Organization and work of the station. By W. H. Jordan. Mar., 1888.
23. Fertilizers. By W. H. Jordan. Apr., 1888.

<sup>8</sup> Superseding the series "Geology and Agriculture;" work reported in Buls. 1-8 was done under the direction of the experiment station.

<sup>9</sup> Bulletins 1-20, First Series, were issued as newspaper slips.

24. Tests of varieties. By W. H. Jordan.—Seeds and injurious insects. By F. L. Harvey. May, 1888.  
 25. [Analysis and valuation of commercial fertilizers sold in the State]. By W. H. Jordan. Aug., 1888.  
 26. The composition and digestibility of certain cattle foods. Oct., 1888.

BULLETINS (SECOND SERIES).<sup>10</sup>

1. Partial statement of analysis of commercial fertilizers for 1889. By W. H. Jordan. May, 1889.
2. The apple maggot (*Trypeta pomonella* Walsh); the potato rot (*Phytophthora infestans* De Bary (*Peronospora infestans* Mont.)). By F. L. Harvey. [1889?]
3. The Babcock milk test adapted to testing cream. By J. M. Bartlett. Sept., 1891.
4. Testing cream and milk fat test and lactometer. By J. M. Bartlett. [1893?]
5. Waste offat in skimmed milk by the deep-setting process. By W. H. Jordan. Jan., 1894.
6. Fruit culture: Varieties. By W. M. Munson. Jan., 1894.
7. Inspection of fertilizers. By W. H. Jordan, J. M. Bartlett, and L. H. Merrill. Feb., 1894.
8. Spraying experiments. By W. M. Munson. Mar., 1894.
9. Tomatoes. By W. M. Munson. Mar., 1894.
10. Cauliflowers. By W. M. Munson. Apr., 1894.
11. Corn as a silage crop. By W. H. Jordan. Apr., 1894.
12. Potatoes: A comparison of the trench system with ordinary culture. By W. M. Munson. May, 1894.
13. The suppression of bovine tuberculosis and glanders. By F. L. Russell. June, 1894.
14. Inspection of fertilizers. By W. H. Jordan, J. M. Bartlett, and L. H. Merrill. Sept., 1894.
15. A scheme for paying for cream by the Babcock test in butter factories. J. M. Bartlett. Oct., 1894.
16. Investigation on the foraging powers of some agricultural plants for phosphoric acid. By W. Balentine. Nov., 1894.
17. Important facts about corn. By W. H. Jordan. Mar., 1895.
18. Inspection of fertilizers, 1895. By W. H. Jordan, J. M. Bartlett, and L. H. Merrill. Mar., 1895.
19. A discussion of certain commercial articles: 1, Fertilizers. By W. H. Jordan. Mar., 1895.
20. A discussion of certain commercial articles: 2, Foods. By W. H. Jordan. Mar., 1895.
21. Notes on smallfruits. By W. M. Munson. Apr., 1895.
22. Inspection of fertilizers. By W. H. Jordan, J. M. Bartlett, and L. H. Merrill. 1895.
23. Preservation of cream for market. By F. L. Russell. Feb., 1896.
24. Cabbages. By H. P. Gould. Mar., 1896.
25. Inspection of fertilizers, 1896. By W. H. Jordan, J. M. Bartlett, and L. H. Merrill. Mar., 1896.
26. Inspection of glassware used by creameries and butter factories to determine the value of cream and milk. By J. M. Bartlett. Mar., 1896.
27. Peas; sweet corn. By H. P. Gould. Mar., 1896.
28. Potato rot: Bordeaux mixture and fungicoid as preventives. By H. P. Gould. Mar., 1896.
29. Notes on spraying. By W. M. Munson. Apr., 1896.
30. Fertilizer inspection. By C. D. Woods, J. M. Bartlett, and L. H. Merrill. Oct., 1896.
31. Modification of the Babcock method. By J. M. Bartlett. Nov., 1896.
32. Three troublesome weeds: Orange hawkweed, wild carrot, buffalo bur. By F. L. Harvey. Jan., 1897.
33. Fertilizer inspection. By C. D. Woods and J. M. Bartlett. Mar., 1897.
34. Box experiments with phosphates. By L. H. Merrill. Apr., 1897.
35. The currant fly, *Epochra canadensis* Loew. By F. L. Harvey. May, 1897.
36. Testing seeds. By C. D. Woods. Aug., 1897.
37. Feeding-stuff inspection. By C. D. Woods. Aug., 1897.
38. Fertilizer inspection. By C. D. Woods and J. M. Bartlett. Oct., 1897.
39. Stock-feeding suggestions. By J. M. Bartlett. Nov., 1897.
40. Celery. By W. M. Munson. Dec., 1897.
41. Dehorning cows. By G. M. Gowell and F. L. Russell. Jan., 1898.
42. Ornamenting home grounds. By W. M. Munson. Feb., 1898.
43. Fertilizer inspection. By C. D. Woods [and others]. Mar., 1898.
44. Feeding-stuff inspection. By C. D. Woods [and others]. May, 1898.
45. Fertilizer inspection. By C. D. Woods [and others]. Oct., 1898.
46. Ornamental plants for Maine. By W. M. Munson. Nov., 1898.
47. Wheat offals sold in Maine in 1898. By C. D. Woods [and others]. Dec., 1898.
48. Feeding-stuff inspection. By C. D. Woods [and others]. Jan., 1899.
49. Care of orchards. By W. M. Munson. Feb., 1899.
50. Fertilizer inspection. By C. D. Woods. Mar., 1899.
51. Feeding-stuff inspection. By C. D. Woods. Apr., 1899.
52. The spraying of plants. By W. M. Munson. May, 1899.
53. Fertilizer inspection. By C. D. Woods and J. M. Bartlett. Sept., 1899.
54. Nuts as food. By C. D. Woods and L. H. Merrill. Oct., 1899.
55. Cereal breakfast foods. By C. D. Woods and L. H. Merrill. Nov., 1899.
56. Apple insects of Maine. By F. L. Harvey and W. M. Munson. Dec., 1899.
57. Experiments with potatoes. By C. D. Woods and J. M. Bartlett. Dec., 1899.
58. Finances, meteorology, and index. Dec., 1899.
59. Feeding-stuff inspection. By C. D. Woods and J. M. Bartlett. Feb., 1900.
60. Fertilizer inspection. By C. D. Woods. Mar., 1900.
61. Notes on insects and plants. By F. L. Harvey. Mar., 1900.
62. The Maine Experiment Station. By C. D. Woods. Apr., 1900.
63. Feeding-stuff inspection. By C. D. Woods and J. M. Bartlett. Apr., 1900.
64. Poultry experiments in 1899: Feeding chickens for growth; breeding for egg production. By G. M. Gowell. June, 1900.
65. Coffee substitutes. By C. D. Woods and L. H. Merrill.—Nut oils. By L. H. Merrill.—Testing seeds. By C. D. Woods.—Potato pomace. By J. M. Bartlett. June, 1900.
66. Fertilizer inspection. By C. D. Woods and J. M. Bartlett. Aug., 1900.
67. Digestion experiments with sheep. By J. M. Bartlett.—Note on heats of combustion. By L. H. Merrill. Sept., 1900.
68. Experiments with insecticides upon potatoes. By C. D. Woods. Oct., 1900.
69. Finances, meteorology, index. Dec., 1900.
70. Oats as grain and fodder. By J. M. Bartlett. Jan., 1901.
71. Feeding-stuff inspection. By C. D. Woods and J. M. Bartlett. Feb., 1901.
72. Fertilizer inspection. By C. D. Woods. Mar., 1901.

<sup>10</sup> The designation "Second series" was dropped after Bul. 25. Bulletins of this series, with the usual exception of those on inspection work, were reprinted in the annual reports of the station from 1893 to 1898, inclusive, and in the annual reports of the Maine Board of Agriculture (after 1901, Commissioner of Agriculture) from 1893 to 1906, inclusive.

73. Experiments with fungicides upon potatoes in 1900: How to fight potato enemies. By C. D. Woods. Apr., 1901.
74. The manurial value of ashes, "mucks," sea weeds, and bone. By C. D. Woods. May, 1901.
75. Analyses of miscellaneous food materials. By C. D. Woods and L. H. Merrill. July, 1901.
76. The horticultural status of the genus *Vaccinium*. By W. M. Munson. Aug., 1901.
77. Fertilizer inspection. By C. D. Woods and J. M. Bartlett. Sept., 1901.
78. Finances, meteorology, index. Dec., 1901.
79. Poultry experiments in 1900 and 1901. By G. M. Gowell. Jan., 1901.
80. Feeding-stuff inspection. By C. D. Woods and J. M. Bartlett. Feb., 1902.
81. Fertilizer inspection. By C. D. Woods and J. M. Bartlett. Mar., 1902.
82. Orchard notes. By W. M. Munson. Apr., 1902.
83. The grass thrips. By L. R. Cary. June, 1902.
84. Cereal breakfast foods. By L. H. Merrill and E. R. Mansfield. July, 1902.
85. Fertilizer inspection. By C. D. Woods and J. M. Bartlett. Oct., 1902.
86. Variation in *Trillium grandiflorum* Salisb. By H. W. Britcher. Nov., 1902.
87. Potato insecticides and fungicides in 1902: oat smut and its prevention. By C. D. Woods. Dec., 1902.
88. Finances, meteorology, index. Dec., 1902.
89. Experiments in orchard culture. By W. M. Munson. Feb., 1903.
90. Fertilizer inspection. By C. D. Woods and J. M. Bartlett. Mar., 1903.
91. The chinch bug in Maine. By H. W. Britcher. Apr., 1903.
92. Feeding-stuff inspection. By C. D. Woods and J. M. Bartlett. May, 1903.
93. Poultry experiments in 1902. By G. M. Gowell. July, 1903.
94. Fertilizer inspection. By C. D. Woods and J. M. Bartlett. Aug., 1903.
95. Dandelions, hawkweeds, ginseng, cankerworms. By W. M. Munson. Sept., 1903.
96. Plant-house Aleyrodes. By L. R. Cary. Oct., 1903.
97. Notes and experiments upon the wheats and flours of Aroostook County. By C. D. Woods and L. H. Merrill. Nov., 1903.
98. Potato experiments in 1903; notes on the angora goat. C. D. Woods.—The preservation of hen manure. By C. D. Woods and J. M. Bartlett. Dec., 1903.
99. Finances, meteorology, index. Dec., 1903.
100. Poultry management. By G. M. Gowell. Feb., 1904.
101. Fertilizer inspection. By C. D. Woods and J. M. Bartlett. Mar., 1904.
102. Feeding-stuff inspection. By C. D. Woods and J. M. Bartlett. Apr., 1904.
103. Entire wheat flour. By C. D. Woods and L. H. Merrill. May, 1904.
104. A study of reciprocal crosses. By M. B. Cummings. June, 1904.
105. Fertilizer inspection. By C. D. Woods and J. M. Bartlett. July, 1904.
106. Soy beans in Maine. By C. D. Woods and J. M. Bartlett.—Feeding experiments with cows; alfalfa. By C. D. Woods. Sept., 1904.
107. Home-mixed fertilizers. By C. D. Woods. Oct., 1904.
108. Brown-tail moth and other orchard moths. By Edith M. Patch. Nov., 1904.
109. Apple maggot. Edith M. Patch and W. M. Munson.—Insect notes for 1904. By Edith M. Patch. Dec., 1904.
110. Digestion experiments with sheep and steers. By J. M. Bartlett. Dec., 1904.
111. Finances, meteorology, index. Dec., 1904.
112. Potato experiments in 1904. By C. D. Woods. Jan., 1905.
113. Summary of experiments in practical horticulture; red clover from various sources. By W. M. Munson. Feb., 1905.
114. Fertilizer inspection. By C. D. Woods. Mar., 1905.
115. Feeding-stuff inspection. By C. D. Woods and J. M. Bartlett.—Cottonseed meal. By J. M. Bartlett. Apr., 1905.
116. Food inspection. By C. D. Woods and L. H. Merrill. May, 1905.
117. Poultry experiments. By G. M. Gowell. July, 1905.
118. Cereal foods. By L. H. Merrill. July, 1905.
119. Food inspection. By C. D. Woods and L. H. Merrill. Oct., 1905.
120. Fertilizer inspection. By C. D. Woods and J. M. Bartlett. Dec., 1905.
121. The cottony grass scale (*Eriopeltis festucae* Fonsc.). By Edith M. Patch. Dec., 1905.
122. Experiments in orchard culture. By W. M. Munson. Dec., 1905.
123. Strawberry crown girdler (*Otiorynchus ovatus* Linn.). By Edith M. Patch. Dec., 1905.
124. Finances, meteorology, index. Dec., 1905.
125. Seed inspection. By C. D. Woods and Bessie G. Tower. Feb., 1906.
126. Field experiments in 1905. By C. D. Woods and J. M. Bartlett.—The effect of the ration on the value of the manure. By J. M. Bartlett. Feb., 1906.
127. Fertilizer inspection. By C. D. Woods and J. M. Bartlett. Mar., 1906.
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129. Feeding-stuff inspection. By C. D. Woods and J. M. Bartlett. Apr., 1906.
130. Poultry experiments, 1905-6. By G. M. Gowell. June, 1906.
131. Indian corn as food for man; digestion experiments with chestnuts. By L. H. Merrill. Oct., 1906.
132. Plant breeding in its relation to American pomology. By W. M. Munson. Nov., 1906.
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134. Insect notes for 1906. By Edith M. Patch. Dec., 1906.
135. Food inspection. By C. D. Woods and J. M. Bartlett. Dec., 1906.
136. Food inspection. By C. D. Woods and J. M. Bartlett. Dec., 1906.
137. Circulars, finances, meteorology, index. Dec., 1906.
138. Seed inspection. By C. D. Woods and R. L. Hammond. Feb., 1907.
139. Orchard notes, 1906. By W. M. Munson. Mar., 1907.
140. Fertilizer inspection. By C. D. Woods and J. M. Bartlett. Mar., 1907.
141. Potato-scab. By W. J. Morse. Mar., 1907.
142. Feeding-stuff inspection. By C. D. Woods and J. M. Bartlett. Apr., 1907.
143. Preliminary notes on the seedling apples of Maine. By W. M. Munson. May, 1907.
144. Poultry experiments, 1906-7. By G. M. Gowell. June, 1907.
145. Food inspection. By C. D. Woods and J. M. Bartlett. Sept., 1907.
146. Fertilizer inspection. By C. D. Woods and J. M. Bartlett. Oct., 1907.
147. The potato plant louse (*Nectarophora solanifolii* Ashmead). By Edith M. Patch. Nov., 1907.
148. Insect notes for 1907. By Edith M. Patch. Nov., 1907.
149. Potato diseases in 1907. By W. J. Morse. Dec., 1907.
150. Finances, meteorology, index. Dec., 1907.
151. Food and drug inspection. By C. D. Woods and J. M. Bartlett. Jan., 1908.
152. Seed inspection. By C. D. Woods and R. L. Hammond. Feb., 1908.
153. Fertilizer inspection. By C. D. Woods and J. M. Bartlett. Mar., 1908.
154. Paris green; Bordeaux mixture. By C. D. Woods and H. H. Hanson. Apr., 1908.

155. Orchard notes, 1907. By W. M. Munson. Mar., 1908.
156. Feeding stuff inspection. By C. D. Woods and J. M. Bartlett. Apr., 1908.
157. Poultry work at the Maine station. By C. D. Woods. May, 1908. A resumé of previous work.
158. Food of man studies. By L. H. Merrill. June, 1908.
159. Appliances and methods for pedigree poultry breeding. By Raymond Pearl and F. M. Surface. July, 1908. See 165.
160. Fertilizer inspection. By C. D. Woods and J. M. Bartlett. Oct., 1908.
161. The saddled prominent (*Heterocampa guttivitta* Walker). By Edith M. Patch. Nov., 1908.
162. Insect notes for 1908. By Edith M. Patch. Dec., 1908.
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165. Poultry notes. By Raymond Pearl and F. M. Surface. Feb., 1909. See also 280.
166. Inheritance of fecundity. By Raymond Pearl and F. M. Surface. Mar., 1909.
167. Field experiments, 1906-8. By C. D. Woods and J. M. Bartlett. May, 1909.
168. The fertility and hatching of eggs. By Raymond Pearl and F. M. Surface. Sept., 1909.
169. Two epidemics of potato blight and rot. By W. J. Morse. Nov., 1909.
170. Apple diseases caused by *Coryneum foliicola* Fekl. and *Phoma mali* Schulz et Sacc. By C. E. Lewis. Nov., 1909.
171. The pine-leaf and the green-winged chermes. By Edith M. Patch. Nov., 1909.
172. The Mycetophilidae of North America, Part I. By O. A. Johannsen. Dec., 1909.
173. Chermes of Maine conifers. By Edith M. Patch. Dec., 1909.
174. Blackleg: A bacterial disease of the stem and tuber of the Irish potato. By W. J. Morse. Dec., 1909.
175. Finances, meteorology, index. Dec., 1909.
176. The ligaments of the oviduct of the domestic fowl. By M. R. Curtis. Jan., 1910.
177. Insect notes for 1909. By O. A. Johannsen. Feb., 1910.
178. A new species of *Endomyces* from decaying apples. By C. E. Lewis. Apr., 1910.
179. Poultry notes. By Raymond Pearl and F. M. Surface. May, 1910.
180. The Mycetophilidae of North America, Part II. By O. A. Johannsen. June, 1910.
181. Gall aphids of the elm. By Edith M. Patch. May, 1910.
182. Four rare aphid genera from Maine. By Edith M. Patch. June, 1910.
183. Experiments in breeding sweet corn. By Raymond Pearl and F. M. Surface. Sept., 1910.
184. Digestion experiments with poultry. By J. M. Bartlett. Oct., 1910.
185. Maine apple diseases. By W. J. Morse and C. E. Lewis. Dec., 1910.
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190. Two species of *Macrosiphum*: *Macrosiphum destructor* and *Macrosiphum solanifolii*. By Edith M. Patch. June, 1911.
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194. Control of the blackleg disease of the potato. By W. J. Morse. Nov., 1911.
195. Insect notes for 1911. By O. A. Johannsen and Edith M. Patch. Dec., 1911.
196. The Mycetophilidae of North America, III. By O. A. Johannsen. Dec., 1911.
197. Finances, meteorology, index. Dec., 1911.
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201. Spirit of nitrous ether. By H. H. Hanson and A. K. Burke. June, 1912.
202. Aphid pests of Maine, I; food plant catalogue of the Aphidae of the world, I; notes on Psyllidae. By Edith M. Patch. July, 1912.
203. Elm leaf curl and woolly apple aphid. By Edith M. Patch. Aug., 1912.
204. A case of triplet calves with some general considerations regarding multiple gestation in normally uniparous animals. By Raymond Pearl. Sept., 1912.
205. The mode of inheritance of fecundity in the domestic fowl. By Raymond Pearl. Nov., 1912.
206. The histology of the oviduct of the domestic hen. By F. M. Surface. Nov., 1912.
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208. Finances, meteorology, index. Dec., 1912.
209. New mineral fertilizer. By C. D. Woods. Jan., 1913.
210. Spruce bud worm and spruce leaf miners. By O. A. Johannsen. Feb., 1913.
211. Potato flea beetle. By O. A. Johannsen. Mar., 1913.
212. Orchard spraying experiments in 1912. By W. J. Morse and G. A. Yeaton. Mar., 1913.
213. Aphid pests of Maine, II: Willow family; food plant catalogue of the Aphidae of the world, II. By Edith M. Patch. June, 1913.
214. The biology of poultry keeping. By Raymond Pearl. July, 1913.
215. The measurement of the intensity of inbreeding. By Raymond Pearl. Aug. 1913.
216. Poultry notes 1911-1913. By Raymond Pearl. Sept., 1913.
217. Woolly aphid of the apple (*Schizoneura lanigera*). By Edith M. Patch. Oct., 1913.
218. Tables for calculating coefficients of inbreeding. By Raymond Pearl and J. R. Miner. Oct., 1913.
219. Comparative studies of certain disease producing species of *Fusarium*. By C. E. Lewis. Oct., 1913.
220. Woolly aphids of the elm; food plant catalogue of the Aphidae of the world, III. By Edith M. Patch. Nov., 1913.
221. Constants for normal variation in the fat content of milk. By Raymond Pearl.—A pedigree system for use in breeding guinea pigs and rabbits. By F. M. Surface.—On the ability of chickens to digest small pieces of aluminum. By M. R. Curtis. Dec., 1913.
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223. Spraying experiments and studies on certain apple diseases in 1913. By W. J. Morse. Jan., 1914.
224. Field experiments. Reported by C. D. Woods. Feb., 1914.
225. Currant and gooseberry aphids in Maine; food plant Aphidae of the world, IV. Edith M. Patch. Feb., 1914.
226. Note on the accuracy of bushel weight determination.—Note on the influence of shape and size of plots in tests of varieties of grain. By C. W. Barber.—A table for estimating the probable significance of statistical constants. By Raymond Pearl and J. R. Miner. Mar., 1914.
227. Powdery scab of potatoes. By W. J. Morse. Mar., 1914.
228. Factors influencing the size, shape and physical constitution of the egg of the domestic fowl. By M. R. Curtis. June, 1914.
229. Studies on oat breeding: I, Variety tests, 1910-1913. By F. M. Surface and C. W. Barber. July, 1914.
230. The rhizoctonia disease of potatoes. By W. J. Morse and Michael Shapovalov. Aug., 1914.

231. Improving egg production by breeding. By Raymond Pearl. Sept., 1914. A popular summary of 205.
232. Histological basis of different shank colors in the domestic fowl. By H. R. Barrows. Sept., 1914.
233. Maine aphids of the rose family. By Edith M. Patch. Nov., 1914.
234. [Abstracts of papers published by the station in 1915 but not included in the bulletins]; finances; meteorology; index. Dec., 1914.
235. Studies on oat breeding: II, Selection within pure lines. By F. M. Surface and Raymond Pearl. Jan., 1915.
236. Field experiments in 1914. By C. D. Woods [and others]. Feb., 1915.
237. The assumption of male secondary characters by a cow with cystic degeneration of the ovaries. By Raymond Pearl and F. M. Surface. Mar., 1915.
238. Leafhoppers of Maine. By Herbert Osborn. Apr., 1915.
239. Studies on bean breeding: I, Standard types of yellow eye beans. By Raymond Pearl and F. M. Surface. May, 1915.
240. Apple spraying experiments in 1914. By W. J. Morse and Michael Shapovalov. May, 1915.
241. Woolly aphid of elm and junberry (*Schizoneura americana* in part, of authors). By Edith M. Patch. Aug., 1915.
242. Pink and green aphid of potato (*Macrosiphum solanifolii* Ashmead). By Edith M. Patch. Oct., 1915.
243. Further data on the measurement of inbreeding. By Raymond Pearl. Nov., 1915.
244. Blueberry insects in Maine. By W. C. Woods. Dec., 1915.
245. Abstracts of papers not included in bulletins: finances; meteorology; index. Dec., 1915.
246. Field experiments in 1915. Reported by C. D. Woods. Jan., 1916.
247. Report of the first Jersey sires' futurity test of the Aroostook Jersey Breeders' Association. By Raymond Pearl. Feb., 1916.
248. Studies of life histories of leafhoppers of Maine. By Herbert Osborn. Mar., 1916.
249. Six years of experimental apple spraying at Highmoor farm. By W. J. Morse. Mar., 1916.
250. Studies on oat breeding: IV, Pure line varieties. By F. M. Surface and Jacob Zinn. May, 1916.
251. Soluble poisons in the poisoned bait spray to control the adult of the apple maggot (*Rhagoletis pomonella* Walsh). By H. H. P. Severin. Apr., 1916.
252. Spraying experiments and apple diseases in 1915. By W. J. Morse. May, 1916.
253. Syrphidae of Maine. By C. L. Metcalf. July, 1916.
254. Studies of life histories of froghoppers of Maine. By Herbert Osborn. Sept., 1916.
255. Dwarf eggs of the domestic fowl. By Raymond Pearl and M. R. Curtis. Oct., 1916.
256. Elm leaf rosette and woolly aphid of the apple, *Schizoneura lanigera* (*americana* in part). By Edith M. Patch. Nov., 1916.
257. Abstracts of papers not included in bulletins: finances; meteorology; index. Dec., 1916.
258. Some commonly neglected factors underlying the stock breeding industry. By Raymond Pearl. Jan., 1917.
259. Pupae of some Maine species of Notodontoidea. By Edna Mosher. Feb., 1917.
260. Barn and field experiments in 1916. Reported by C. D. Woods. Mar., 1917.
261. Report of progress on animal husbandry investigations in 1916. By Raymond Pearl. June, 1917.
262. The change of milk flow with age, as determined from seven day records of Jersey cows. By Raymond Pearl and S. W. Patterson. July, 1917.
263. Syrphidae of Maine, second report: Life history studies. By C. L. Metcalf. Aug., 1917.
264. Life history, habits, natural enemies and methods of control of the currant fruit fly (*Epochra canadensis* Loew). By H. H. P. Severin. Sept., 1917.
265. The biology of the alder flea beetle (*Alyca bimarginata* Say). By W. C. Woods. Oct., 1917.
266. The chemical composition of green sprouted oats; fish wastes for feeding animals. By J. M. Bartlett. Nov., 1917.
267. The aphid of choke cherry and grain (*Aphis pseudoavenae* sp. n.). By Edith M. Patch. Nov., 1917.
268. Abstracts of papers not included in bulletins; finances; meteorology; index. Dec., 1917.
269. Barn and field experiments in 1917. Reported by C. D. Woods. Feb., 1918.
270. Eastern aphids: A few species of Prociphilus; food plant catalogue of the Aphidae of the world, V. By Edith M. Patch. Apr., 1918.
271. Apple spraying experiments in 1916 and 1917. By W. J. Morse. May, 1918.
272. Inheritance studies of certain color and horn characteristics in first generation crosses of dairy and beef breeds. By J. W. Gowen. Aug., 1918.
273. The biology of Maine species of Alyca. By W. C. Woods. Oct., 1918.
274. Results of progress on animal husbandry investigations in 1917. By J. W. Gowen. Dec., 1918.
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276. The meadow plant bug [*Miris dolabratus*]. By Herbert Osborn. Mar., 1919.
277. Potatostudies. By C. D. Woods. Feb., 1919.
278. Soil test experiment at Aroostook farm. Second report. By C. D. Woods. Mar., 1919.
279. The variation of Ayrshire cows in the quantity and fat content of their milk. By Raymond Pearl and J. R. Minor. Apr., 1919.
280. Appliances and methods for pedigree poultry breeding at the Maine station. By J. W. Gowen. June 1919. Largely a reprint and compilation of 159-165.
281. Studies in milk secretion: VII, Transmitting qualities of Jersey sires for milk yield, butter-fat percentage, and butter-fat. By Raymond Pearl, J. W. Gowen, and J. R. Rice. Oct., 1919.
282. Three pink and green aphids of the rose; food plant catalog of the Aphididae of the world, VI. By Edith M. Patch. Dec., 1919.
283. Report of progress on animal husbandry investigations in 1919. By J. W. Gowen. Dec., 1919.
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286. The variation of milk secretion with age in Jersey cattle. By J. W. Gowen. May, 1920.
287. Self sterility and cross sterility in the apple. By J. W. Gowen. May, 1920.
288. Some observations upon the effect of borax in fertilizers. By W. J. Morse. June, 1920.
289. The correlation between milk yield of one lactation and that of succeeding lactations. By J. W. Gowen. June, 1920.
290. The variation of butter-fat percentage with age in Jersey cattle. By J. W. Gowen. Aug., 1920.
291. The correlation between the butter-fat percentage of one lactation and the butter-fat percentage of succeeding lactations in Jersey cattle. By J. W. Gowen. Aug., 1920.
292. Potato mosaic. By Donald Folsom. Aug., 1920.
293. Studies in milk secretion: VIII, On the influence of age on the milk yield and butter-fat percentage, as determined from the 365 day records of Holstein-Friesian cattle. By J. W. Gowen. Oct., 1920.
294. Normal and abnormal germination of grass fruits. By Jacob Zinn. Dec., 1920.
295. Abstracts of papers not included in bulletins; finances; meteorology; index. Dec., 1920.



## INDEXES.

In addition to the index for each annual report, which includes also the bulletins of the year, collective indexes have been published as follows:

Agricultural bibliography of Maine. . . also an index to the volumes of Agriculture of Maine from 1850 to 1892. By B. W. McKeen. 1893. (A separately paged report included in Ann. Rpt. of Me. Bd. Agr. 35, 1892.)

NOTE.—The volumes indexed contain some accounts of early experimental work and, with a few exceptions, reports and bulletins of the agricultural experiment station up to and including 1892.

Index to reports for the years 1885-1896 [and Bulletins, second series, 6-31<sup>11</sup>], inclusive. (*In Ann. Rpt. Me. Agr. Expt. Sta.* 12 (1896), p. 191-227.)

Index to Reports for the years 1897 to 1900 [and Bulletins, second series, 32-69<sup>11</sup>], inclusive. (*In Ann. Rpt. Me. Agr. Expt. Sta.* 16 (1900) (or Bulletin 69), p. 209-228.)

Index to reports for the years 1901 to 1905 and to bulletins 70 to 124, inclusive. (*In Ann. Rpt. Me. Agr. Expt. Sta.* 21 (1905) (or Bulletin 124), p. 243-268.)

Index to reports for the years 1906 to 1910 and to Bulletins 125 to 186, inclusive. (*In Ann. Rpt. Me. Agr. Expt. Sta.* 26 (1910) (or Bulletin 186), p. 404-435.)

Index to reports for the years 1911 to 1915 and to Bulletins 235 [i. e., 187] to 245, inclusive. (*In Ann. Rpt. Me. Agr. Expt. Sta.* 31 (1915) (or Bulletin 245), p. 325-334.)

Index to reports for the years 1916 to 1920 and to Bulletins 246 to 295, inclusive. (*In Ann. Rpt. Me. Agr. Expt. Sta.* 36 (1920) (or Bulletin 295), p. 231-236.)

## MARYLAND.

## Maryland Agricultural Experiment Station, College Park.

## BULLETINS.

1. History, organization, and work of the station. By H. E. Alvord. June, 1888.
2. Cutting seed potatoes for planting. By H. E. Alvord.—[Details of the potato experiment. By W. H. Bishop.]—Appendix with information about the station. Sept., 1888.
3. Fodder corn and fodder cane; appendix about taking and sending samples. By H. E. Alvord. Dec., 1888.
4. Experiment orchard. By W. H. Bishop. Mar., 1889.
5. Horticultural department and field experiments. By H. E. Alvord. June, 1889.
6. Commercial fertilizers. By H. E. Alvord and H. J. Patterson. Sept., 1889.
7. Farm manures. By H. E. Alvord. Dec., 1889. Merely a statement that the material prepared for this bulletin was destroyed by fire.
8. Some feeding trials: I, Feeding old milk cows for beef. By A. I. Hayward.—II, Feeding heifers on ensilage only. By H. E. Alvord.—III, Working oxen fed for beef. By H. E. Alvord. Mar., 1890.
9. Comparison of strawberries. By W. H. Bishop. June, 1890.
10. Wheat: Fertilizer experiments and variety tests. By A. I. Hayward. Sept., 1890.
11. Experiments with tomatoes. By W. H. Bishop and H. J. Patterson. Dec., 1890. See 113.
12. Pig feeding. By H. E. Alvord and A. I. Hayward. Mar., 1891.
13. Strawberry experiments. By J. S. Robinson. June, 1891.
14. Wheat: Variety tests and fertilizer experiments, 1891. By A. I. Hayward. Sept., 1891.
15. The experiment vineyard. [By T. L. Brunk.] Dec., 1891.
16. Wheat insects. By E. W. Doran. Mar., 1892.
17. Experiments with strawberries. By J. S. Robinson.—Seed potatoes: Comparison of northern and home-grown seed. By E. H. Brinkley. June, 1892.
18. Fertilizer tests with sweet potatoes. By E. H. Brinkley. Oct., 1892.
19. Experiments with tomatoes. By J. S. Robinson. Dec., 1892.
20. The composition and digestibility of the different parts of corn fodder. (Stover): Feeding experiments conducted 1891-92. By H. J. Patterson. Mar., 1893.
21. The soils of Maryland. By Milton Whitney. June, 1893.
22. Steer feeding: A well-balanced versus a poorly balanced ration. By R. H. Miller. Sept., 1893.
23. Injurious insects of Maryland. By C. V. Riley. Dec., 1893.
24. Composition of commercial fertilizers sold in this State. By H. B. McDonnell. Feb., 1894.
25. Agricultural and horticultural departments: Corn, potatoes. By R. H. Miller and E. H. Brinkley.—Tomatoes, strawberries, grapes, etc. By J. S. Robinson. Mar., 1894. See 113.
26. Tobacco experiments. By H. J. Patterson. June, 1894.
27. Composition of commercial fertilizers sold in this State. By H. B. McDonnell [and others]. Aug., 1894.
28. Experiments with wheat and barley for the years 1893 and 1894. By R. H. Miller and E. H. Brinkley. Sept., 1894.
29. Further investigations on the soils of Maryland. By Milton Whitney and Sothoron Key. Dec., 1894.
30. Composition of commercial fertilizers sold in this State; the fertilizer law. By H. B. McDonnell [and others]. Jan., 1895. Appendix. Tables for calculating fertilizer analyses and valuation. Dec., 1894.
31. Potato experiments. By R. H. Miller and E. H. Brinkley. Mar., 1895.
32. The San José scale. By C. V. Riley. Apr., 1895.
33. Horticultural and Agricultural departments: Small fruits, vegetables. By J. S. Robinson.—Field corn. By R. H. Miller and E. H. Brinkley. Apr., 1895.
34. Composition of commercial fertilizers sold in this State. By H. B. McDonnell [and others]. July, 1895.
35. Wheat, barley, oats, and hay experiments for the year 1895. By R. H. Miller and E. H. Brinkley. Sept., 1895.
36. Steer feeding: A well-balanced versus a poorly balanced ration. By R. H. Miller and E. H. Brinkley. Dec., 1895.
37. Composition of commercial fertilizers sold in this State. By H. B. McDonnell [and others]. Special issue. Feb., 1896.
38. Potato experiments. By R. H. Miller and E. H. Brinkley. 1896.
39. Spray calendar. By E. G. Lodeman. Apr., 1896. A folded sheet 9 by 24 in., printed on one side.
40. Composition of commercial fertilizers sold in this State. By H. B. McDonnell [and others]. Special issue. Aug., 1896.
41. Test of methods of preparing and feeding corn fodder. By H. J. Patterson. Sept., 1896.
42. The Maryland trees and nursery-stock law and other information of special interest to nurserymen and fruit growers. By W. G. Johnson. Special issue. Oct., 1896.

<sup>11</sup> Usually excepting bulletins on inspection work.

43. Report upon the value of a new corn product. By H. J. Patterson. Dec., 1896.
44. The soils of the Hagerstown valley. By C. W. Dorsey. Dec., 1896.
45. Composition of commercial fertilizers sold in this State. By H. B. McDonnell [and others]. Special issue. Feb., 1897.
46. Corn and potato experiments. By R. H. Miller and E. H. Brinkley. Mar., 1897.
47. Dairy farming. By H. J. Patterson. June, 1897.
48. Some common injurious plant lice, with suggestions for their destruction. By W. G. Johnson. June, 1897.
49. Composition of commercial fertilizers sold in this State. By H. B. McDonnell [and others]. Special issue. Aug., 1897.
50. Rust and leopard spot: Two dangerous diseases of asparagus. By W. G. Johnson. Sept., 1897.
51. Horse feeding: Tests of the digestibility of oats, corn, hay, and the new corn product. By H. J. Patterson. Dec., 1897.
52. Composition of commercial fertilizers sold in this State. By H. B. McDonnell [and others]. Special issue. Feb., 1898.
53. Special investigation of the so-called "new" horse disease in Maryland. By S. S. Buckley. Mar., 1898.
54. Tomato Experiments 1896 and 1897. By J. S. Robinson. Mar., 1898. See 113.
55. The black peach aphid (*Aphis prunicola* Kalt.); cutworms in young tobacco; law providing for the suppression and control of insect pests and plant diseases in Maryland. By W. G. Johnson. May, 1898.
56. Wheat, winter oats, barley, and lime experiments for the years 1896 and 1897. By R. H. Miller and E. H. Brinkley. June, 1898.
57. Report on the San José scale in Maryland and remedies for its suppression and control. By W. G. Johnson. Aug., 1898.
58. The Hessian fly in Maryland. By W. G. Johnson.—Some important wheat diseases. By C. O. Townsend. Aug., 1898.
59. Sweet potato insects. By E. D. Sanderson. Jan., 1899.
60. Some diseases of the sweet potato and how to treat them. By C. O. Townsend. Mar., 1899.
61. The sugar beet in Maryland. By H. W. Wiley. June, 1899.
62. Experiments with wheat, corn, and potatoes. By H. J. Patterson [and others]. June, 1899.
63. Experiments with feeding pigs. By H. J. Patterson. Dec., 1899.
64. A study of the cause of mottled butter. By C. F. Doane. Jan., 1900.
65. Insecticides, fungicides, and spraying apparatus. By W. G. Johnson, C. O. Townsend, and H. P. Gould. Mar., 1900.
66. Lime: Sources and relation to agriculture. By H. J. Patterson. May, 1900.
67. The culture and handling of tobacco in Maryland. By H. J. Patterson. June, 1900.
68. Fertilizer experiments with different sources of phosphoric acid. By H. J. Patterson. Sept., 1900.
69. The influence of feed and care on the individuality of cows. By C. F. Doane. Oct., 1900.
70. The chemical composition of Maryland soils. By F. P. Veitch. Jan., 1901.
71. Notes on spraying peaches and plums in 1900. By C. O. Townsend and H. P. Gould. Feb., 1901.
72. Peach growing in Maryland. By H. P. Gould. Mar., 1901.
73. Suggestions about combating the San José scale. By H. P. Gould. Apr., 1901.
74. Notes on celery blight. By C. O. Townsend. May, 1901.
75. The effect of hydrocyanic-acid gas upon grains and other seeds. By C. O. Townsend. June, 1901.
76. Parturient paresis—milk fever, calving fever. By S. S. Buckley. June, 1901.
77. The comparative digestibility of raw, pasteurized, and cooked milk. By C. F. Doane and T. M. Price. Aug., 1901.
78. The dehorning of stock. By C. F. Doane. Dec., 1901.
79. The disinfecting properties of washing powders. By C. F. Doane. Jan., 1902.
80. Acute epizootic leucoencephalitis in horses. By W. G. McCallum and S. S. Buckley. Feb., 1902.
81. Soils and fertilizers for greenhouse crops. By H. J. Patterson and T. H. White. Feb., 1902.
82. Thinning fruits. By E. P. Sandsten. May, 1902.
83. Investigations as to the cause of pithiness in celery. By E. P. Sandsten and T. H. White. May, 1902.
84. Some feeding experiments with cows, and tables for the computation of rations for farm animals. By H. J. Patterson. June, 1902.
85. Alfalfa for Maryland. By W. T. Tallafiero. Aug., 1902.
86. The influence of preservatives upon the food value of milk. By C. F. Doane and T. M. Price. Sept., 1902.
87. The periodical cicada and its occurrence in Maryland in 1902. By A. L. Quaintance. Nov., 1902.
88. Economical methods for improving the keeping qualities of milk. By C. F. Doane. May, 1903.
89. Experiments with potash as a fertilizer. By H. J. Patterson. June, 1903.
90. Experiments on the control of San José scale. By T. B. Symons. Dec., 1903.
91. Experiments with nitrogenous fertilizers. By H. J. Patterson. Feb., 1904.
92. Notes on apple culture. By C. F. Austin. Mar., 1904.
93. Second report on the cause of pithiness in celery. By C. F. Austin and T. H. White. May, 1904.
94. Systems for keeping milk and butter records. By C. F. Doane. July, 1904.
95. The character of milk during the period of heat. By C. F. Doane. Aug., 1904.
96. Sweet corn: Breeding, growing, and curing for seed. By Augustus Stabler and [H. J. Patterson]. Sept., 1904.
97. The relative profits of selling milk, cream, and butter. By C. F. Doane. Oct., 1904.
98. Home-grown protein as a substitute for purchased feeds and tests of soiling crops. By C. F. Doane. Nov., 1904.
99. Test of different spraying materials for the control of San José scale. By T. B. Symons. Dec., 1904.
100. The wild legumes of Maryland and their utilization. By J. B. S. Norton and E. P. Walls. Mar., 1905.
101. The common injurious and beneficial insects of Maryland. By T. B. Symons. Apr., 1905.
102. Leucocytes in milk and their significance. By C. F. Doane. May, 1905.
103. Methods of tobacco seed selections. By W. W. Cobey. June, 1905.
104. Tests of materials for bedding cows. By C. F. Doane. July, 1905.
105. Experiments with fumigating nursery stock. By T. B. Symons and A. B. Gahan. Aug., 1905.
106. The influence of the size of the grain and the germ of corn upon the plant. By E. P. Walls. Sept., 1905.
107. 1905—spraying experiments for San José scale. By T. B. Symons and A. B. Gahan. Oct., 1905.
108. Irish potato diseases. By J. B. S. Norton. Apr., 1906.
109. Mosquitoes. By T. B. Symons, T. H. Coffin, and A. B. Gahan. May, 1906.
110. Results of experiments on the liming of soils. By H. J. Patterson. Sept., 1906.
111. The oyster shell scale. By T. B. Symons. Oct., 1906.
112. Treating San José scale: Results of experiments conducted in 1906. By T. B. Symons and A. B. Gahan. Nov., 1906.
113. Tomatoes: Testing varieties, culture, training and spraying. By T. H. White and W. R. Ballard. Dec., 1906. Summarizes, with subsequent data, information contained in Buls. 11, 25 and 54.

114. Fertilizer experiments with different sources of phosphoric acid. By H. J. Patterson. Jan., 1907.
115. Control of insect pests and diseases of Maryland crops. By J. B. S. Norton and T. B. Symons. Feb., 1907.
116. Marketing fruit and truck crops. By W. N. Hutt. Mar., 1907.
117. The digestibility of molasses feeds. By H. J. Patterson and Raymond Outwater. Apr., 1907.
118. Alfalfa in Maryland. By C. W. Nash. June, 1907.
119. Greenhouse pests of Maryland. By A. B. Gahan. July, 1907.
120. Sweet corn investigations. By M. N. Straughn. Aug., 1907.
121. The beef cattle industry in Maryland. By B. E. Porter. Sept., 1907.
122. Stable manure experiments. By W. T. L. Taliaferro and H. J. Patterson. Oct., 1907.
123. Spraying for San José scale. By T. B. Symons and G. P. Weldon.—The peach lecanium or terrapin scale (*Eulecanium nigro-fasciatum* Perg.). By A. B. Gahan. Nov., 1907.
124. Strawberries. By C. P. Close, W. R. Ballard, and T. H. White. Dec., 1907.
125. Nut growing in Maryland. By C. P. Close. Feb., 1908.
126. Manuring and fertilizing truck crops. By C. P. Close and T. H. White. Apr., 1908.
127. Miscellaneous greenhouse notes. By C. P. Close, T. H. White, and W. R. Ballard. May, 1908.
128. The effect of animal digestion and fermentation of manures on the vitality of seeds. By E. I. Oswald. June, 1908.
129. Silos and silage in Maryland. By H. L. Crisp and H. J. Patterson. July, 1908.
130. Nurseries and nursery inspection. By T. B. Symons, J. B. S. Norton, and C. P. Close. Aug., 1908.
131. Miscellaneous treatment for San José scale. By T. B. Symons. Nov., 1908.
132. Irish potato investigations. By C. P. Close and T. H. White. Feb., 1909.
133. Cabbage experiments and culture. By C. P. Close and T. H. White. May, 1909.
134. Brown-tail moth, house fly and mosquito. By T. B. Symons. Apr., 1909.
135. Butter making in Maryland. By C. W. Melick. May, 1909.
136. Whipped cream. By C. W. Melick. June, 1909.
137. The Angoumois grain-moth. By T. B. Symons. July, 1909.
138. The poultry industry in Maryland. By C. L. Opperman. Aug., 1909.
139. Nodular taeniasis or tapeworm disease of fowls. By G. E. Gage and C. L. Opperman. Oct., 1909.
140. The San José scale and the osage orange hedge. By T. B. Symons and L. M. Pears. Nov., 1909.
141. Corn: Variety tests, seed breeding, selection and testing. By C. W. Nash. Jan., 1910.
142. The codling moth (*Carpocapsa pomonella*). By T. B. Symons and L. M. Pears. Feb., 1910.
143. Controlling fungous diseases. By J. B. S. Norton and A. J. Norman. Feb., 1910.
144. Apple culture. By C. P. Close. Mar., 1910. See 178.
145. Tuberculosis of animals. By S. S. Buckley. June, 1910.
146. Poultry house construction and its influence on the domestic fowl, Pt. I. By C. L. Opperman. July, 1910.
147. Wheat: Variety tests and diseases. By Nickolas Schmitz. Aug., 1910.
148. Spraying, fumigating, and dipping for the control of San José scale. By T. B. Symons, L. M. Pears, and E. N. Cory. Nov., 1910.
149. The terrapin scale. By T. B. Symons and E. N. Cory. Dec., 1910.
150. Pig feeding experiments and two kinds of hoghouses. By A. L. Stabler. Jan., 1911.
151. Fertilizers on asparagus. By C. P. Close, T. H. White, and W. R. Ballard. Feb., 1911.
152. Aphidiinae of North America. By A. B. Gahan. Apr., 1911.
153. A study showing bacteria and animal organisms determined in the feces and intestinal mucosa of healthy chickens. By G. E. Gage. May, 1911.
154. Bee keeping in Maryland: I. The status of bee keeping in the State. By T. B. Symons.—II, The management of bees. By A. H. McCray. June, 1911.
155. Maryland weeds and other harmful plants. By J. B. S. Norton. Aug., 1911.
156. Rose mildew. By J. B. S. Norton and T. H. White. Sept., 1911.
157. Some experiments with poultry: Increasing the egg production. By C. L. Opperman.—The time required for eggs to become fertile after a male has been added to the breeding pen. By R. H. Waite.—The persistence of fertility after the male has been removed from the breeding pen. By R. H. Waite. Sept., 1911.
158. Miscellaneous greenhouse experiments. By C. P. Close and T. H. White. Sept., 1911.
159. Peach culture. By C. P. Close and W. R. Ballard. Oct., 1911.
160. Strawberries. By C. P. Close, W. R. Ballard, and T. H. White. Oct., 1911.
161. Treatment for the San José scale and terrapin scale insects. By T. B. Symons, E. N. Cory, and O. G. Babcock. Nov., 1911.
162. The quality of seed: Results of seed analyses. By J. B. S. Norton. Dec., 1911.
163. Increasing the durability of fence posts. By F. W. Besley. Jan., 1912.
164. Line-sulfur as a summer spray. By J. B. S. Norton and T. B. Symons. Feb., 1912.
165. Boys' corn-growing contest in 1911: Suggestions for corn growing and conducting a contest. By Nickolas Schmitz and W. E. Hanger. Feb., 1912.
166. How lime is distributed through and lost from soils: Factors influencing the diffusion and depletion of lime in soils. By L. B. Broughton. May, 1912.
167. Changes in potatoes during storage. By C. O. Appleman. May, 1912.
168. By-product feeds. By H. J. Patterson and H. J. White. July, 1912.
169. Cow-testing associations. By G. H. Hibbard and G. E. Wolcott. Aug., 1912.
170. The Maryland seed law. By C. P. Smith. Oct., 1912.
171. Poultry notes. By R. H. Waite. Dec., 1912.
172. Irish potato investigations from 1909 to 1913. By T. H. White. Jan., 1913.
173. Tomato variations induced by culture. By T. H. White. Jan., 1913.
174. Hog cholera. By B. M. Bolton. Feb., 1913.
175. Miscellaneous insect pests. By T. B. Symons and E. N. Cory. Mar., 1913.
176. The peach-tree borer (*Sanninoidea exitiosa* Say). By E. N. Cory. Apr., 1913.
177. Open stables versus closed stables for dairy animals. By S. S. Buckley.—The bacterial content of milk produced in the open stable and in the closed stable. By R. W. Lamson. May, 1913.
178. Apple orchard experiments. By W. R. Ballard [and C. P. Close]. Oct., 1913. A revision of 144.
179. The quality of clover and vetch seed found in Maryland markets in 1913. By C. P. Smith. Mar., 1914.
180. Tomatoes: Varieties, diseases, culture. By T. H. White, J. B. S. Norton, and J. F. Monroe. Mar. 1914.
181. Inexpensive aids in producing sanitary milk. By R. W. Lamson. Mar., 1914.
182. Small fruits. By W. R. Ballard. Apr., 1914.
183. Biochemical and physiological study of the rest period in the tubers of *Solanum tuberosum*. By C. O. Appleman. May, 1914.
184. The physical character of the curd of milk from different breeds; curd as an index of the food value of milk; studies of the proteid content of milk. By S. S. Buckley. June, 1914.

185. The Maryland hog: Statistics, housing, feeding, care and management, miscellaneous information. By C. L. Opperman.—Breeds and breeding. By R. H. Ruffner.—Diseases of swine. By S. S. Buckley. Aug., 1914.
186. Land drainage in Maryland. By J. R. Haswell. Oct., 1914.
187. Profitable and unprofitable cows: Cow testing associations in Maryland. By G. S. Wolcott. Nov., 1914.
188. Types and varieties of Maryland tobacco. By W. W. Garner and D. E. Brown. Dec., 1914.
189. The quality of grass and rape seed found in Maryland markets in 1913. By C. P. Smith. Jan., 1915.
190. Tests of varieties of corn. By W. E. Hanger. Feb., 1915.
191. Relation of catalase and oxidases to respiration in plants. By C. O. Appleman. Sept., 1915.
192. Internal action of chemicals on resistance of tomatoes to leaf diseases. By J. B. S. Norton. Jan., 1916.
193. Tests of the availability of different grades of ground limestone. By L. B. Broughton, R. C. Williams and G. S. Frazer. Feb., 1916.
194. Sudan grass. By Nickolas Schmitz. Feb., 1916.
195. Onions: Experiments and culture. By T. H. White. Mar., 1916.
196. Methods and problems in pear and apple breeding. By W. R. Ballard. Apr., 1916.
197. Clover and grass seed inspected in 1914. By C. P. Smith. July, 1916.
198. Wheat. By Nickolas Schmitz. Oct., 1916.
199. Tests of the value of stable manure, commercial fertilizer, and crimson clover for vegetable crops. By T. H. White. Dec., 1916.
200. Winter oats, barley, spelt and emmer. By Nickolas Schmitz. Jan., 1917.
201. Soy beans. By Nickolas Schmitz. Feb., 1917.
202. Timothy fertilization and culture. By Nickolas Schmitz. Feb., 1917.
203. Agricultural seed inspected in 1915. By C. P. Smith. Mar., 1917.
204. Variety tests of potatoes, tomatoes, cabbage and other vegetables. By T. H. White. Mar., 1917.
205. Fumigation of greenhouses. By E. N. Cory. Apr., 1917.
206. The hothouse milliped. By E. N. Cory and F. H. O'Neill. Apr., 1917.
207. Plum growing in Maryland. By F. S. Holmes. May, 1917.
208. *Tarsonemus pallidus* Banks, a pest of geraniums. By Philip Garman. June, 1917.
209. The oriental peach pest (*Laspeyresia molesta* Busck), a dangerous new fruit insect of Maryland. By Philip Garman. Dec., 1917.
210. Agricultural seed inspected in 1916. By C. P. Smith. Jan., 1918.
211. Strawberry notes. By W. R. Ballard. Jan., 1918.
212. Physiological basis for the preparation of potatoes for seed. By C. O. Appleman. Feb., 1918.
213. The control of house flies by the maggot trap. By E. N. Cory. Feb., 1918.
214. Tests of an "all crops soil" inoculum. By Paul Emerson. Mar., 1918.
215. Fertilizing and cultural experiments with Irish potatoes. By T. H. White. Mar., 1918.
216. Conditions detrimental to seed production. By J. B. S. Norton and C. E. Leathers. June, 1918.
217. The relation of milk yield to age at first calf. By R. C. Towles. June, 1918.
218. Report of nut tree investigations in Maryland. By E. S. Johnston. June, 1918.
219. The revised agricultural seed law. By C. P. Smith. Aug., 1918.
220. Agricultural seed inspected in 1917. By C. P. Smith. Sept., 1918.
221. An accurate method of determining which hens are laying. By R. H. Waite. Sept., 1918.
222. Experiments with fertilizers on greenhouse crops; the pollination of greenhouse tomatoes. By T. H. White. Sept., 1918.
223. A comparison of several species of Lepidoptera infesting peach and apple in Maryland, with additional notes on the oriental peach moth. By Philip Garman. Oct., 1918.
224. Agricultural seed inspected in March and April, 1918. By C. P. Smith. Dec., 1918.
225. Fertilizer experiments with tobacco. By W. W. Garner and D. E. Brown. Jan., 1919.
226. How to caponize. By R. H. Waite. Feb., 1919.
227. Citrus fruit rinds as a hog feed. By R. S. Allen. Mar., 1919.
228. Growing alfalfa in Maryland. By Nickolas Schmitz. July, 1919.
229. Agricultural seed inspected in the fall of 1918. By C. P. Smith. July, 1919.
230. Poultry appliances and methods. By R. H. Waite. Aug., 1919.
231. Field damaged wheat for poultry. By R. H. Waite. Sept., 1919.
232. Mushrooms. By T. H. White. Sept., 1919.
233. The effect of age of eggs on their hatching quality. By R. H. Waite. Dec., 1919.
234. Earthworms, the important factor in the transmission of gapes in chickens. By R. H. Waite. Jan., 1920.
235. Capons vs. cockerels. A comparison of their rate of growth and feed consumption. By R. H. Waite. Mar., 1920.
236. The control of the strawberry leaf beetle (*Typophorus canellus* Fabr.). By E. N. Cory and W. C. Travers. May, 1920.
237. Variety tests of corn, wheat, and soy beans. By J. E. Metzger and Geary Eppley. July, 1920.
238. Seed inspection for 1919. By F. S. Holmes. July, 1920.
239. The relation of certain greenhouse pests to the transmission of a geranium leaf spot. By Philip Garman. Oct., 1920.
240. Internal fungous parasites of agricultural seeds. By C. C. Chen. Nov., 1920.
241. Annotated list of Halcitini. By A. B. Duckett. Dec., 1920.

## SPECIAL BULLETINS.

- [A.] Facts about the station. Fair edition, 1889.
- [B.] Potash and paying crops. [Compiled by A. de Ghequier]. July, 1890. Identical with Georgia Sta. Bul. 9, West Virginia Sta. Special Bul. [1], Tennessee Sta. Special Bul. D.
- [C.] Composition of commercial fertilizers sold in this State. Oct., 1890.
- D. Composition of commercial fertilizers sold in this State. Feb., 1891.
- E. Composition of commercial fertilizers sold in this State. By H. E. Alvord. Aug., 1891.
- F. The agricultural outlook for Maryland. By Edward Stake. Jan., 1892.
- G. Composition of commercial fertilizers sold in this State. Feb., 1892.
- H. Government direction of agriculture in Europe. By J. E. Ray, jr. July, 1892.
- I. Composition of commercial fertilizers sold in this State. Aug., 1892.
- J. Composition of commercial fertilizers sold in this State. By H. B. McDonnell. Feb., 1893.
- K. Composition of commercial fertilizers sold in this State. By H. B. McDonnell. June, 1893.

## MASSACHUSETTS.

Massachusetts (State) Agricultural Experiment Station, Amherst, 1883-1895.

In 1895 the Massachusetts (State) Agricultural Experiment Station and the Hatch Experiment Station of the Massachusetts Agricultural College were consolidated under the name of the latter. In 1907 this name was changed to Massachusetts Agricultural Experiment Station.

## BULLETINS.

1. [Brief account of organization]; Fodder and analyses. By C. A. Goessmann. July, 1883.
2. Fertilizer analyses. By C. A. Goessmann. Aug., 1883.
3. Fodder analyses; fertilizer analyses. By C. A. Goessmann. Sept., 1883.
4. Fodder analyses; fertilizer analyses. By C. A. Goessmann. Oct., 1883.
5. Fodder analyses; fertilizer analyses. By C. A. Goessmann. Nov., 1883.
6. Fodder analyses; fertilizer analyses. By C. A. Goessmann. Dec., 1883.
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155. New fertilizer materials and by-products. By H. D. Haskins.—Cocoanut meal. By J. B. Lindsey. July, 1914.
156. Electrical injuries to trees. By G. E. Stone. Oct., 1914. A revision of 91.
157. The marguerite fly (*Phytomyza chrysanthememi* Kowarz). By M. T. Smulyan. Nov., 1914.
158. The composition, digestibility and feeding value of molasses meal, cottonseed meal and hulls, cocoa shells, grain screenings, flax shives, Mellen's food refuse, and Postum cereal residue (CXX feed). By J. B. Lindsey and P. H. Smith. Dec., 1914.
159. The technical description of apples. By J. K. Shaw. Dec., 1914.
160. Report of cranberry substitution for 1914. By H. J. Franklin. Apr., 1915.
161. The effect on a crop of clover of liming the soil. By F. W. Morse.—Toxic effect of iron and aluminum salts on clover seedlings. By R. W. Ruprecht. Apr., 1915.
162. Phosphates in Massachusetts agriculture: Importance, selection, and use. By W. P. Brooks. May, 1915.
163. Bacillary white diarrhea (*Bacterium pullorum* infection) in young chicks in Massachusetts. By G. E. Gage and B. H. Paige. Aug., 1915.
164. Substitutes for milk in the rearing of dairy calves; the cost of rearing a dairy cow. By J. B. Lindsey. Nov., 1915.
165. The effect of sulfate of ammonia on soil. By R. W. Ruprecht and F. W. Morse. Nov., 1915.
166. Improved methods for fat analysis. By E. B. Holland, J. C. Reed, and J. P. Buckley. Dec., 1915.
167. The relation of hydrogen ion concentration of media to the proteolytic activity of *Bacillus subtilis*; proteolysis of *Strept. erysipelatis* and *Strept. lacticus* compared under different hydrogen ion concentration. By Arao Itano. Jan., 1916.
168. Report of cranberry substitution for 1915. By H. J. Franklin. May, 1916.
169. Connecticut Valley onion supply and distribution. By A. E. Cance, W. L. Machmer, and F. W. Read. Sept., 1916.
170. Shade trees: Characteristics, adaptation, diseases, and care. By G. E. Stone. Sept., 1916. Supersedes 125.
171. A chemical study of the asparagus plant. By F. W. Morse. Dec., 1916.
172. Experiments in keeping asparagus after cutting. By F. W. Morse. Mar., 1917.
173. The cost of distributing milk in six cities and towns in Massachusetts. By A. E. Cance and R. H. Ferguson. May, 1917.
174. The composition, digestibility, and feeding value of pumpkins. By J. B. Lindsey. Nov., 1917.
175. Mosaic disease of tobacco. By G. H. Chapman. May, 1917.
176. The cause of the injurious effect of sulfate of ammonia when used as a fertilizer. By R. W. Ruprecht and F. W. Morse. Oct., 1917.
177. Potato plant lice and their control. By W. S. Regan. Oct., 1917.
178. The European corn borer (*Pyrausta nubilalis* Hubner), a recently established pest in Massachusetts. By S. C. Vinal. Dec., 1917.
179. The greenhouse red spider (*Tetranychus bimaculatus* Harvey), attacking cucumbers and methods for its control. By S. C. Vinal. Nov., 1917.
180. Report of the cranberry substitution for 1916. By H. J. Franklin.—Observations on the spoilage of cranberries due to lack of proper ventilation. By C. L. Shear, N. E. Stevens, and B. A. Rudolph. Nov., 1917.
181. Digestion experiments with sheep. By J. B. Lindsey, C. L. Beals, and P. H. Smith. Nov., 1917.
182. Soy beans (*Glycine hispida*) as human food. By Arao Itano. Mar., 1918.
183. Rose canker and its control. By P. J. Anderson. May, 1918.
184. Late dormant versus delayed dormant or green tip treatment for the control of apple aphids. By W. S. Regan. July, 1918.
185. The inheritance of seed coat color in garden beans. By J. K. Shaw and J. B. Norton. July, 1918.
186. The composition, digestibility and feeding value of alfalfa; the value of corn bran for milk production. By J. B. Lindsey and C. L. Beals. Nov., 1918.
187. Clarification of milk, I. By C. E. Marshall [and others]. Nov., 1918.

188. The nutrition of the horse. By J. B. Lindsey. Dec., 1918.  
 189. The European corn borer and its control. By S. C. Vinal and D. J. Caffrey. Mar., 1919.  
 190. The propagation of apple trees on their own roots. By J. K. Shaw. Sept., 1919.  
 191. Practical results from studies on egg production. By H. D. Goodale. Oct., 1919.  
 192. Seventh report of the cranberry substation, 1917-1919. By H. J. Franklin. Oct., 1919.  
 193. The supply and distribution of Connecticut Valley cigar leaf tobacco. By S. H. DeVault. Oct., 1919.  
 194. A fertilizer experiment with asparagus: Description of the experiment. By F. W. Morse.—Comments and conclusions. By W. P. Brooks. Dec., 1919.  
 195. Tobacco investigations: Progress report, including miscellaneous observations on tobacco. By G. H. Chapman. Mar., 1920.  
 196. Methods of applying manure. By W. P. Brooks. Sept., 1920.  
 197. The nutritive value of cattle feeds: I, Velvet bean feed for farm stock. By J. B. Lindsey and C. L. Beals. Sept., 1920.  
 198. Studies of cranberries during storage: Chemical studies. By F. W. Morse and C. P. Jones.—Fungi studies. By B. A. Rudolph and H. J. Franklin. Sept., 1920.  
 199. Broodiness in domestic fowl: Data concerning its inheritance in the Rhode Island Red breed. By H. D. Goodale, Ruby Sanborn, and Donald White. Sept., 1920.  
 200. The nutritive value of cattle feeds: Oat by-products for farm stock. By J. B. Lindsey and C. L. Beals. Oct., 1920. Also popular edition.

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- A dangerous insect pest in Medford: The gipsy moth (*Ocneria dispar* L.). By C. H. Fernald. Nov., 1889. See also Bul. 7.  
 On the most profitable use of commercial manures. By Paul Wagner. Translated by Charles Wellington. May, 1890. Also published in Mass. Agr. College Ann. Rpt., 27 (1889), p. 58-99.  
 Green manuring, by Julius Kuhn. Translated and condensed by E. W. Allen. Jan., 1894. From Ztschr. Landw. Cent. Ver. Sachsen, 50 (1893), No. 1, p. 3-13; No. 3, p. 95-101; No. 4, p. 117-128. Also published in Mass. Agr. College Ann. Rpt., 31 (1893), p. 87-97.  
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 The dairy law and its results: Dairy law; inspection of glassware. By J. B. Lindsey.—Inspection of Babcock machines. By N. J. Hunting.—The Babcock test. By E. B. Holland.—Creameries and milk depots in Massachusetts. July, 1903.

## TECHNICAL BULLETINS.

1. The greenhouse Aleyrodes (*A. vaporariorum* Westw.) and the strawberry Aleyrodes (*A. packardii* Morrill): A study of the insects and of their treatment. By A. W. Morrill. Aug., 1903.
2. The graft union. By F. A. Waugh. Oct., 1904.
3. The blossom end rot of tomatoes. By Elizabeth H. Smith. Apr., 1907.

## INDEXES.

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## MICHIGAN.

## Experiment Station of Michigan State Agricultural College, East Lansing.

## BULLETINS.

- Bulletins 1-33, 1885-1888, were issued by the Michigan Agricultural College prior to the organization of the agricultural experiment station under the Hatch Act. Publications of the station with the exception of quarterly bulletins have been reprinted in the annual reports of the Michigan State Board of Agriculture.
1. Early amber cane as a forage crop. By R. C. Kedzie [and others]. Mar., 1885.
  2. [Seed testing. By Louis Knapper.] Apr., 1885.
  3. The black wheat stalk *Isomoma*. By A. J. Cook. May, 1885.
  4. Feeding experiments. By Samuel Johnson. May, 1885.
  5. The vitality of seeds buried in the soil. By W. J. Beal. July, 1885.
  6. Diseases of farm animals. By E. A. A. Grange. Sept., 1885.
  7. Notes on fruits; notes on vegetables; notes on some hardy and desirable ornamental trees and shrubs. By L. H. Bailey. Oct., 1885.
  8. Wintering bees. By A. J. Cook. Nov., 1885.
  9. Marl. By R. C. Kedzie. Dec., 1885.
  10. A disease among horses the result of injudicious feeding. By E. A. A. Grange. Feb., 1886.
  11. Making a lawn; mixed lawn grass seeds analyzed. By W. J. Beal. Mar., 1886.
  12. Hints on rural adornment, with lists of hardy ornamental plants; horticultural experiments and lists of recent acquisitions in fruits. By L. H. Bailey. Apr., 1886.
  13. Potato culture: Varieties; experiments with different amounts of seed. By Samuel Johnson. [Apr., 1886.]
  14. The codling moth and bark louse. By A. J. Cook. May, 1886.
  15. Manurial value of ashes. By R. C. Kedzie. June, 1886.
  16. Replies to questions about grasses. By W. J. Beal. July, 1886.
  17. The carpet beetle. By A. J. Cook. Sept., 1886.
  18. Wheat: Notes on different varieties; experiments with different amounts of seed. By Samuel Johnson. Sept., 1886.
  19. Notes on tomatoes. By L. H. Bailey. Sept., 1886.
  20. Analysis of commercial fertilizers. By R. C. Kedzie. Oct., 1886. Corrected Dec., 1886.
  21. Lessons on growing forest trees. By W. J. Beal. Nov., 1886.
  22. Observations on a disease affecting the eyes of sheep. By E. A. A. Grange. Jan., 1887.
  23. Varieties of apples for market. By L. H. Bailey. Feb., 1887.
  24. Feeding steers of different breeds. By Samuel Johnson. Mar., 1887. See 44.
  25. Laminitis, a disease of the foot of the horse. By E. A. A. Grange. Apr., 1887.
  26. Plant lice and the codling moth. By A. J. Cook. May, 1887.
  27. Commercial fertilizers: Inspection for 1887. By R. C. Kedzie. Aug., 1887.
  28. Forest products of the museum of economic botany. By W. J. Beal. Sept., 1887.

29. A new contagious disease among horses in America. By E. A. A. Grange. Oct., 1877 [i. e. 1887].
30. Feeding steers of different breeds. By Samuel Johnson. Nov., 1887. See 44.
31. Being the annual report of the professor of horticulture and landscape gardening to the president of the college for the year 1887. By L. H. Bailey. Nov., 1887.
32. Proceedings of the forestry convention held in Grand Rapids, Mich., Jan. 26 and 27, 1888, under the auspices of the Independent Forestry Commission.
33. Hints for Arbor Day. By Samuel Johnson. Feb., 1888.

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34. Report of experiments with potatoes and oats. By Samuel Johnson. Mar., 1888.
35. Weather service department: Report of the director. By N. B. Conger. [Apr., 1888].
36. Experimental work among cattle. By E. A. A. Grange. May, 1888.
37. The jack pine plains. By R. C. Kedzie. June, 1888.
38. Experiments with wheat; experiments with plaster, ashes, and salt as a top-dressing for meadow and pasture lands. By Samuel Johnson. Aug., 1888.
39. Experiments with insecticides. By A. J. Cook. Oct., 1888.
40. Quantities of seed required for given lengths of drill; experiment in hybridizing; notes on radishes; notes on germination; effects of latitude on season of flowering and fruiting. By L. H. Bailey. Oct., 1888.
41. Warming water for dairy cows. By Samuel Johnson. Oct., 1888.
42. Experimental work among horses. By E. A. A. Grange. Nov., 1888.
43. Weather service department: Annual report of the director and the rainfall charts of Michigan. By N. B. Conger. Jan. 1889.
44. Feeding steers of different breeds [with an appendix consisting of Bulletins 24 and 30, reprinted]. By Samuel Johnson. Jan., 1889.
45. Why not plant a grove? By W. J. Beal. Mar., 1889.
46. Potatoes, roots, fertilizers, and oats. By Samuel Johnson. Mar., 1889.
47. Silos and ensilage. By Samuel Johnson. Apr., 1889.
48. Horticultural department: Potatoes; kale; experiments with squashes tomatoes. By L. R. Taft. Apr., 1889.
49. Chemical composition of cornstalks, hay, and screenings. By R. C. Kedzie. May, 1889.
50. The grain plant louse. By A. J. Cook. June, 1889.
51. Enemies of the wheat aphid. By A. J. Cook. July, 1889.
52. Commercial fertilizers. By R. C. Kedzie. July, 1889.
53. Spraying with the arsenites. By A. J. Cook. Aug., 1889.
54. Experiments and observations on the jack-pine plains. By W. J. Beal. Oct., 1889.
55. Fruit testing at the South Haven substation. By T. T. Lyon. Dec., 1889.
56. Rib grass or narrow-leaved plantain in fields of clover. By W. J. Beal. Feb., 1890.
57. Vegetables: Comparative tests, methods of culture. By L. R. Taft. Mar., 1890.
58. Insecticides. By A. J. Cook. Mar., 1890.
59. Fruit list and apple scab. By L. R. Taft and B. T. Galloway. Apr., 1890.
60. Pigs—breed tests; potatoes—variety tests. By Eugene Davenport. Apr., 1890
61. Foul brood. By A. J. Cook. Apr., 1890. See Special 107.
62. The English sparrow. By C. B. Cook. May, 1890.
63. Greenhouse building and heating. By L. R. Taft. July, 1890.
64. Fertilizer analyses. By R. C. Kedzie. July, 1890.
65. Planting for honey. By A. J. Cook. Aug., 1890.
66. The plum curculio. By A. J. Cook. Sept., 1890.
67. Fruit testing at the South Haven substation. By T. T. Lyon. Oct., 1890.
68. The jack-pine plains; milk, ensilage, and fertilizer analyses. By R. C. Kedzie. Oct., 1890.
69. Feeding steers of different breeds. By Eugene Davenport. Nov., 1890.
70. Vegetables, varieties and methods [of culture]. By L. R. Taft. Jan., 1891.
71. Beet sugar. By R. C. Kedzie. Feb., 1891.
72. Six worst weeds. By W. J. Beal. Feb., 1891.
73. Kerosene emulsion; some new insects. By A. J. Cook and G. C. Davis. Apr., 1891.
74. Foot rot in sheep. By E. A. A. Grange. May, 1891.
75. Fertilizer analyses. By R. C. Kedzie. July, 1891.
76. Kerosene emulsion. By A. J. Cook and G. C. Davis. Oct., 1891.
77. Comparing the yield of old meadows with those recently seeded. By W. J. Beal. Nov., 1891.
78. Glanders and farcy. By E. A. A. Grange. Dec., 1891.
79. Vegetable tests. By L. R. Taft and H. P. Gladden. Jan., 1892.
80. Fruits. By T. T. Lyon. Jan., 1892.
81. Fruit notes: Strawberries, raspberries, Russian fruits, orchard fertilizers. By L. R. Taft. Mar., 1892.
82. Sugar beets: Results for 1891. By R. C. Kedzie. Mar., 1892.
83. Insecticides and fungicides. By L. R. Taft. Apr., 1892.
84. Roots versus silage for fattening lambs. By P. M. Harwood and F. B. Mumford. Apr., 1892.
85. Potato tests. By L. R. Taft. Apr., 1892.
86. Fertilizer analyses. By R. C. Kedzie. July, 1892.
87. Smut in oats and wheat: Jensen or hot-water treatment. By P. M. Harwood. Sept., 1892. Second and third editions issued.
88. Fruit report, South Haven substation. By T. T. Lyon. Dec., 1892.
89. Conformation of horse governing selection. By E. A. A. Grange. Dec., 1892. See also 110.
90. Vegetable tests. By L. R. Taft, H. P. Gladden, and R. J. Coryell. Feb., 1893.
91. Two plants for sandy land: [1], Spurry (*Spergula arvensis*). By Oscar Clute and O. Palmer.—[2], Flat pea (*Lathyrus silvestris*). By Oscar Clute and F. B. Mumford. Feb., 1893. Also, second edition.
92. Small fruit notes; spraying. By L. R. Taft, H. P. Gladden, and E. J. Coryell. Mar., 1893.
93. Potatoes; amounts of seed: Original experiments together with compilations from twelve other stations. By P. M. Harwood and P. G. Holden. Apr., 1893.
94. Birds of Michigan. By A. J. Cook. Apr., 1893. Second edition, Sept., 1893.
95. Potatoes. By P. M. Harwood [and others]. Apr., 1893.
96. Honey analyses. By A. J. Cook. July, 1893.
97. Fertilizer analyses. By R. C. Kedzie. July, 1893.
98. Locusts; the horn fly. By G. C. Davis. July, 1893.
99. Michigan soils. By R. C. Kedzie. July, 1893.
100. Eighty new strawberries. By L. R. Taft and H. P. Gladden. Aug., 1893.

- 101-102. 101, Composition of wheat and straw; composition of certain forage plants; adulteration of ground feed; mineral residues in sprayed fruits. By R. C. Kedzie.—102, Insects injurious to celery. By G. C. Davis. Dec., 1893.
- 103-106. 103, Peach and plum culture in Michigan. By L. R. Taft.—104, A year among fruits: Report of South Haven substation. By T. T. Lyon.—105, Michigan fruit list. By L. R. Taft.—106, Strawberries and raspberries. By L. R. Taft and H. P. Gladden. Feb., 1894.
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111. The cultivated raspberries of the United States. By A. A. Crozier. June, 1894. Also second edition, Sept., 1894.
112. Fertilizer analyses. By R. C. Kedzie. June, 1894.
- 113-116. 113, Fattening lambs. By C. D. Smith and F. B. Mumford.—114, Rape as a forage plant. By C. D. Smith and F. B. Mumford.—115, Management of swamp lands: muck and marl. By R. C. Kedzie.—116, Insects of the clover field. By G. C. Davis. Oct., 1894.
117. Millet. By A. A. Crozier. Dec., 1894. See also special Bul. 2.
118. Fruits at South Haven. By T. T. Lyon. Jan., 1895.
- 119-120. 119, Potatoes. By L. R. Taft and U. P. Hedrick.—120, Vegetable novelties and notions. By L. R. Taft, H. P. Gladden and U. P. Hedrick. Feb., 1895.
121. Pests of orchard and garden. By L. R. Taft and G. C. Davis. Apr., 1895.
- 122-124. 122, Small fruit notes. By L. R. Taft and H. P. Gladden.—123, Native plums and Russian cherries. By U. P. Hedrick.—124, The apple orchard. By L. R. Taft. Apr., 1895.
125. Crimson clover and other topics. By A. A. Crozier. June, 1895.
126. Fertilizer analyses. By R. C. Kedzie. June, 1895.
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- 129-130. 129, Fruits at South Haven. By T. T. Lyon.—130, Fruits at the agricultural college. By L. R. Taft and H. P. Gladden. Feb., 1896.
131. Potatoes. By L. R. Taft.—Vegetable tests. By H. P. Gladden and U. P. Hedrick. Apr., 1896.
132. Climbing cutworms; control of the common granary insects; carpet beetles and clothes moths. By G. C. Davis. Apr., 1896.
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145. Fertilizer analyses. By R. C. Kedzie. June, 1897.
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148. Strawberries. By L. R. Taft and H. P. Gladden. Sept., 1897.
149. Feeding dairy cows. By C. D. Smith. Nov., 1897. See 234.
150. Sugar beets in Michigan in 1897. By C. D. Smith and R. C. Kedzie. Dec., 1897.
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- 157-158. 157, Hog cholera. By G. A. Waterman.—158, Some experiments with poultry. By C. D. Smith and C. S. Brooks. May, 1898.
159. A study of normal temperatures and the tuberculin test. By C. E. Marshall. June, 1898.
160. Some insects of the year 1897. By W. B. Barrows and R. H. Pettit. June, 1898.
161. Fertilizer analyses. By R. C. Kedzie. July, 1898.
162. A sketch of the original distribution of white pine in lower peninsula. By C. F. Wheeler.—Present condition of forests and stumps land. By F. C. Skeels.—Reforesting stump lands. By W. J. Beal.—Meteorology of the forests. By R. C. Kedzie.—Forestry legislation. By C. D. Smith. Nov., 1898.
163. Strawberry culture: Notes on varieties. By L. R. Taft and H. P. Gladden. Nov., 1898.
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- 166-167. 166, A grade dairy herd. By C. D. Smith.—167, A discussion of farm dairy methods. By G. H. True. Jan., 1899.
168. Michigan fruit list. By L. R. Taft. Feb., 1899.
169. Notes from the South Haven substation. By L. R. Taft and T. T. Lyon. Feb., 1899.
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174. Fertilizer analyses. By R. C. Kedzie and L. S. Munson. June, 1899.
175. Some insects of the year 1898. By W. B. Barrows and R. H. Pettit. July, 1899.
176. Strawberry notes for 1899. By L. R. Taft and H. P. Gladden. Aug., 1899.
177. South Haven report for 1899. By L. R. Taft and S. H. Fulton. Dec., 1899.
178. The production and marketing of wool. By H. W. Mumford. Jan., 1900.
179. Sugar beet investigations. By J. D. Towar. Feb., 1900.
180. Some insects of the year 1899. By R. H. Pettit. Mar., 1900.
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185. Fertilizer analyses. By R. C. Kedzie and L. H. Van Wormer. June, 1900.
186. [First report of the] Upper Peninsula Experiment Station. By C. D. Smith [and others]. Dec., 1900.
187. Report of South Haven Substation [for 1900]. By S. H. Fulton. Jan., 1901.
188. Experiments with sugar beets. By J. D. Towar. Feb., 1901.
189. Notes on strawberries. By L. R. Taft and M. L. Dean. Mar., 1901.
190. Vegetable tests for 1900. By L. R. Taft and M. L. Dean. Apr., 1901.
191. Shrinkage of farm products. By C. D. Smith, May, 1901.

192. Fertilizer analyses. By R. C. Kedzie and L. H. Van Wormer. June, 1901.
193. Some experiments with beet pulp as a stock food. By C. D. Smith [and others]. Nov., 1901.
194. Report of South Haven substation for 1901. By S. H. Fulton. Dec., 1901.
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197. Sugar beet experiments, 1901. By J. D. Towar. Feb., 1902.
198. Sand lucerne. By J. D. Towar. Mar., 1902.
199. Cowpeas, soy beans, and winter vetch. By J. D. Towar. Apr., 1902.
200. Some insects of the year 1901. By R. H. Pettit. May, 1902.
201. Aération of milk, a popular consideration of Special Bulletin 16. By C. E. Marshall. June, 1902.
202. Fertilizer analyses. By R. C. Kedzie and F. W. Robison. June, 1902.
203. Analyses of some of the commercial feeding stuffs of Michigan. By F. W. Robison. Dec., 1902.
204. Mosquitoes and other insects of the year 1902. By R. H. Pettit. Jan., 1903.
- 205-206. 205, Report of South Haven substation. By T. A. Ferrand.—206, Notes on small fruits. By M. L. Dean. Jan.-Feb., 1903.
207. Sugar-beet experiments, 1902. By C. D. Smith. Mar., 1903.
208. Michigan mushrooms: A few of the common edible fungi occurring in the State. By B. O. Longyear. Apr., 1903.
209. Vegetables and bush fruits. By L. R. Taft and M. L. Dean. June, 1903.
210. Fertilizer bulletin. By F. W. Robison. June, 1903.
211. Breakfast foods. By F. W. Robison. Apr., 1904.
212. Seed testing for farmers. By B. O. Longyear. Apr., 1904.
- 213-214. 213, Small fruits for 1904. By L. R. Taft and M. L. Dean.—214, Tomatoes and potatoes. By L. R. Taft and M. L. Dean. May, 1904.
215. Experiments with sugar beets in 1903. By C. D. Smith. June, 1904.
216. A brief review of Special Bulletins Nos. 24-26. By C. D. Smith. June, 1904.
217. Fertilizer bulletin. By F. W. Robison. July, 1904.
218. Some essential soil changes produced by micro-organisms. By S. F. Edwards. Aug., 1904.
219. Soil moisture: Its importance and management. By J. A. Jeffery. Sept., 1904.
220. Dried beet pulp and dried molasses beet pulp for fattening sheep. By R. S. Shaw. Oct., 1904.
221. The care and handling of milk: I, Milk, its purity and its impurity. By C. E. Marshall and W. R. Wright.—II, Practical conditions for the production of milk. By John Michels. Nov., 1904.
222. The codling moth in Michigan. By R. H. Pettit. Dec., 1904.
223. Part I, Equipment for breeding, feeding, care, and management of swine; Part II, Preliminary report on forage crops for swine. By R. S. Shaw. Jan., 1905.
224. Observations on the influence of nodules on the roots upon the composition of soy beans and cowpeas. By C. D. Smith and F. W. Robison. May, 1905.
225. Alfalfa in Michigan. By C. D. Smith. June, 1905.
226. The work at the substations: Review of Special Bulletins 27, 28, 30, and 31. By L. R. Taft and C. D. Smith. June, 1905.
227. Legumes other than alfalfa. By C. D. Smith. June, 1905.
228. The discussion of the milk problem from the standpoint of production. By C. E. Marshall. June, 1905.
229. A popular review of Special Bulletin No. 33 on "The associative action of bacteria in the souring of milk." By C. E. Marshall. June, 1905.
230. Some bacterial diseases of plants prevalent in Michigan. By W. G. Sackett. June, 1905.
231. Suggestions concerning legume inoculation. By L. T. Clark. June, 1905.
232. Fertilizer analyses. By A. J. Patten. July, 1905.
233. Insects of the garden. By R. H. Pettit. Dec., 1905.
234. Feeding dairy cows, review and partial reprint of Bulletin 149. By C. D. Smith. Feb., 1906.
235. Succotash as a soiling crop. By R. S. Shaw. Feb., 1906.
236. Spraying for potato blight in 1905. By C. A. McCue. Apr., 1906.
237. Digester tankage for swine. By R. S. Shaw. May, 1906.
238. First annual report of grade dairy herd. By R. S. Shaw and A. C. Anderson. May, 1906.
239. Fertilizer analyses. By A. J. Patten and Dorothea Moxness. Aug., 1906.
240. Roots supplementary to silage for dairy cows. By R. S. Shaw and H. W. Norton, jr. Sept., 1906.
241. A plan for the improvement of Michigan cattle. By R. S. Shaw. Sept., 1906.
242. Feeding whole grain. By R. S. Shaw and H. W. Norton, jr. Oct., 1906.
243. Cull beans as a food for swine. By R. S. Shaw and A. C. Anderson. Nov., 1906.
244. Insects new or unusual in Michigan. By R. H. Pettit. Dec., 1906.
245. Poultry raising. By J. G. Halpin. Jan., 1907.
246. The practical use of starters. By L. D. Bushnell and W. R. Wright. June, 1907.
247. Dried beet pulp for fattening steers. By R. S. Shaw and H. W. Norton, jr. June, 1907.
248. Fertilizer analyses. By A. J. Patten. Aug., 1907.
249. Protection of buildings from lightning. By A. R. Sawyer.—[System of lightning protection used on college barns.] By L. J. Smith. Aug., 1907. Supersedes Spec. Bul. 3.
250. College farm buildings. By R. S. Shaw and J. A. Jeffery. Oct., 1907.
251. Insects of 1907. By R. H. Pettit. Mar., 1908.
252. Fertilizer analyses. By A. J. Patten, S. L. Jodidi, and C. B. Collingwood. Aug., 1908.
253. Can the general farmer afford to grow apples? and suggestions on improving and spraying apple orchards. By S. B. Hartman and H. J. Eustace. Mar., 1909.
254. Preliminary report on wintering farm work horses. By H. W. Norton, jr. Mar., 1909.
255. Cement silos in Michigan. By J. A. Jeffery. May, 1909.
256. Fertilizer analyses. By A. J. Patten and C. B. Collingwood. Aug., 1909.
257. Rearing calves on skim milk and supplementary feed. By H. W. Norton, jr. Oct., 1909.
258. Insects of field crops. By R. H. Pettit. Feb., 1910.
259. Bean growing. By W. F. Raven. Mar., 1910.
260. Seeds of Michigan weeds. By W. J. Beal. Mar., 1910.
261. Baby beef production. By H. W. Norton, jr. Apr., 1910.
262. Suggestions on planting orchards. By O. K. White. July, 1910.
263. Fertilizer analyses. By A. J. Patten, O. B. Winter, and C. G. Clippert. Aug., 1910.
264. Second report of grade dairy herd. By A. C. Anderson. Apr., 1911.
265. Fertilizer analyses. By A. J. Patten, O. B. Winter, and C. G. Clippert. Aug., 1911.
266. Poultry house construction and yarding. By H. L. Kempster. Aug., 1911.
267. Michigan weeds. By W. J. Beal. Dec., 1911. Also revised edition by E. A. Bessey. Nov., 1915.
268. Wheat improvement. By F. A. Spragg. Aug., 1912.
269. Fertilizer analyses. By A. J. Patten, W. C. Marti, and Arao Itano. Sept., 1912.
270. Seed analyses for 1911 and 1912. By E. A. Bessey. Dec., 1912.
271. Alfalfa growing in Michigan. By V. M. Shoemith. Feb., 1913.
272. Fertilizer analyses. By A. J. Patten [and others]. Sept., 1913.

273. Utilization of muck lands. By C. S. Robinson. June, 1914.  
 274. Fertilizer analyses. By A. J. Patten, O. B. Winter, and O. F. Jensen. Oct., 1914.  
 275. Fertilizer analyses. By A. J. Patten [and others]. Dec., 1915.  
 276. Commercial feeding stuffs. By A. J. Patten [and others]. Nov., 1916.  
 277. Studies in the cost of market milk production. By A. C. Anderson and F. T. Riddell. Dec., 1916.  
 278. Fertilizer analyses. By A. J. Patten [and others]. Dec., 1916.  
 279. Commercial feeding stuffs. By A. J. Patten [and others]. Sept., 1917.  
 280. Fertilizer analyses. By A. J. Patten [and others]. Dec., 1917.  
 281. Trees, shrubs and plants for farm and home planting. By C. P. Halligan. Feb., 1918.  
 282. Commercial feeding stuffs. By A. J. Patten [and others]. Sept., 1918.  
 283. Fertilizer analyses. By A. J. Patten [and others]. Dec., 1918.  
 284. Some information and suggestions concerning the use of phosphorus. By M. M. McCool, G. M. Grantham, and C. E. Millar. Jan., 1919.  
 285. Commercial feeding stuffs. By A. J. Patten [and others]. Sept., 1919.  
 286. Studies in the cost of milk production, 2. By F. T. Riddell and A. C. Anderson. Jan., 1920.  
 287. Fertilizer analyses. By A. J. Patten [and others]. Dec., 1919.  
 288. Commercial feeding stuffs. By A. J. Patten [and others]. Sept., 1920.  
 289. Corn growing in Michigan. By J. F. Cox and J. R. Duncan. Nov., 1920.  
 290. Soil fertility. By M. M. McCool, C. E. Millar, and G. M. Grantham. Dec., 1920.

## QUARTERLY BULLETINS.

Quarterly Bulletins, Vol. 1, No. 1—Vol. 3, No. 2. Aug., 1918—Nov., 1920. Each number contains a variety of articles relating to agricultural practice, based upon investigational work of the station.

## SPECIAL BULLETINS.

1. A year with bees. By R. L. Taylor. June, 1894.
2. Millet, abstract of Bulletin 117. By A. A. Crozier. Dec., 1894.
3. Pests of house and ornamental plants. By G. C. Davis. Nov., 1896.
4. Lightning rods and protection of farm buildings from lightning; a good road for five dollars. By R. C. Kedzie. Oct., 1896.
5. The apple orchard; spraying—why and how. By L. R. Taft. Nov., 1896.
6. Forecasts of frosts. By C. D. Smith and R. C. Kedzie. Dec., 1896.
7. Building silos. By C. D. Smith. Dec., 1896.
8. A new danger to fruit growers: The dreaded San José scale. By L. R. Taft. Jan., 1897.
9. Planting sugar beets. By R. C. Kedzie. Mar., 1897.
10. Suggestions on farm accounts. By C. D. Smith. Nov., 1898.
11. Sugar beets. By C. D. Smith and R. C. Kedzie. Feb., 1899.
12. Frozen trees and their treatment. By L. R. Taft. Mar., 1899.
13. Spraying calendar. By L. R. Taft and C. D. Smith. Mar., 1899.
14. Review of Professor Bang's work with contagious abortion. By C. E. Marshall. Dec., 1899.
15. Foul brood. By C. D. Smith and J. M. Rankin. June, 1901.
16. Spraying calendar. By L. R. Taft and C. D. Smith. Mar., 1902.
17. Aeration of milk. By C. E. Marshall. June, 1902.
18. Mosquitoes and other insects of the year 1902. By R. H. Pettit. Jan., 1903.
19. Sugar beets in the Upper Peninsula. By C. D. Smith and L. M. Geismar. Mar., 1903.
20. Spraying calendar. By L. R. Taft and C. D. Smith. May, 1903.
21. Report of the Upper Peninsula substation for the years 1901 and 1902. By C. D. Smith and L. M. Geismar. Aug., 1903.
22. Cheese problems. By John Michels. Sept., 1903.
23. The crop of corn. By J. A. Jeffery. Jan., 1904.
24. A preliminary note on the associative action of bacteria in the souring of milk and in other milk fermentations. By C. E. Marshall. Jan., 1904.
25. Insects injurious to fruits in Michigan. By R. H. Pettit. Feb., 1904.
26. Fungus diseases of fruits in Michigan. By B. O. Longyear. Mar., 1904.
27. Spraying calendar. By L. R. Taft and C. D. Smith. Apr., 1904.
28. Report of South Haven substation for 1903. By T. A. Farrand. Apr., 1904.
29. Report of the Upper Peninsula substation for the year 1903. By L. M. Geismar and C. D. Smith. May, 1904.
30. Additional work upon the associative action of bacteria in the souring of milk and in other milk fermentations. By C. E. Marshall. May, 1904.
31. Report of South Haven substation for 1904. By T. A. Farrand. Apr., 1905.
32. Report of Upper Peninsula substation for 1904. By L. M. Geismar. Apr., 1905.
33. Investigation regarding succulence. By F. W. Robinson. May, 1905.
34. Extended studies of the associative action of bacteria in the souring of milk. By C. E. Marshall. June, 1905.
35. Corn improvement. J. A. Jeffery. Mar., 1906. See Spec. Bul. 47.
36. Report of the South Haven substation for 1905. By L. R. Taft and T. A. Farrand. Mar., 1906.
37. Spraying calendar. By L. R. Taft and C. D. Smith. Mar., 1907.
38. Thrips on oats. By R. H. Pettit. July, 1907.
39. Pollination of forced tomatoes. By S. W. Fletcher and O. I. Gregg. Oct., 1907.
40. Report of the South Haven substation for 1906. By L. R. Taft and F. A. Wilken. Apr., 1907.
41. Report of the Upper Peninsula substation for the years 1905 and 1906. By L. M. Geismar. Apr., 1907.
42. Bacterial associations in the souring of milk. By C. E. Marshall and B. Ferrand. Mar., 1908.
43. The solvent action of soil bacteria upon the insoluble phosphates of raw bone meal and natural raw rock phosphate. By W. G. Sackett, A. J. Patten, and C. W. Brown. Mar., 1908.
44. Varieties of fruit originated in Michigan. By S. W. Fletcher. Aug., 1910.
45. Spraying calendar. By L. R. Taft and R. S. Shaw. May, 1908.
46. Report of the South Haven substation for 1907. By L. R. Taft and F. A. Wilken. May, 1907.
47. Corn improvement. (Revision of Spec. Bul. 34.) By J. A. Jeffery. Oct., 1908.
48. Report of South Haven substation for 1908. By L. R. Taft and F. A. Wilken. Feb., 1909.
49. Grape-spraying experiments in Michigan, 1907-8. By C. L. Shear and L. A. Hawkins. July, 1909.
50. Grand Traverse disease or Lake shore disease. By C. D. Smith and Ward Giltner. May, 1909.
51. Spray and practice outline for fruit growers. By H. J. Eustace and R. H. Pettit. Mar., 1910.
52. Corn production in the Upper Peninsula of Michigan. By L. M. Geismar. Apr., 1910.
53. Grasshoppers and their control. By L. M. Geismar. June, 1910.

54. Spray and practice outline for fruit growers, 1911. By H. J. Eustace and R. H. Pettit. Feb., 1911.
55. Analyses of miscellaneous materials. By A. J. Patten. June, 1911.
56. The drainage. By J. A. Jeffery. Jan., 1911.
57. Spray and practice outline for fruit growers, 1912. By H. J. Eustace and R. H. Pettit. Mar., 1912.
58. Foul brood. By R. H. Pettit. Apr., 1912. See Spec. Bul. 64.
59. Small fruit culture. By F. A. Wilkin. Mar., 1913.
60. Celery culture in Michigan. By C. P. Halligan. Mar., 1913.
61. Spray and practice outline for fruit growers, 1913. By H. J. Eustace and R. H. Pettit. Mar., 1913.
62. The tuberculin tests for tuberculosis in cattle. By E. T. Hallman. Sept., 1913.
63. Commercial peach growing in Michigan. By F. M. Barden and H. J. Eustace. Sept., 1913.
64. Foul brood. Supplement to Special Bulletin 58. F. E. Millen. Jan., 1914.
65. Hog cholera and preventive treatment. W. S. Robbins. Feb., 1914.
66. The potato diseases of Michigan. By G. H. Coons. Mar., 1914.
67. Onion culture on muck lands. By C. P. Halligan. Mar., 1914.
68. Two Michigan bean diseases. By J. H. Muncie. Mar., 1914.
69. Spray and practice outline for 1914. By H. J. Eustace and R. H. Pettit. Mar., 1914.
70. Michigan agriculture, its present status and wonderful possibilities. By R. S. Shaw. Apr., 1914.
71. Studies in the range of variation of the per cent of butter fat in the milk of individual cows. By A. C. Anderson. June, 1914.
72. Some ginseng troubles. By E. A. Bessey and J. A. McClintock. Feb., 1915.
73. Spray and practice outline for 1915. By H. J. Eustace and R. H. Pettit. Mar., 1915.
74. Analyses of some materials sold as insecticides and fungicides. By A. J. Patten and D. C. Kellogg. July, 1915.
75. Durability of concrete drain tile. By O. B. Winter and H. H. Musselman. Dec., 1915.
76. Transferring bees. By F. E. Millen. Dec., 1915.
77. The septoria leaf spot disease of celery or celery blight. By G. H. Coons and Ezra Levin. Mar., 1916. A popular edition of Tech. Bul. 53. Also a Dutch edition.
78. Christmas tree plantations. By A. K. Chittenden. Apr., 1916.
79. Michigan's shifting sands: Their control and better utilization. By F. H. Sanford. May, 1916.
80. Yellow rocket, a dangerous weed. By E. A. Bessey. May, 1917.
81. The leaf-spot disease of tomato. By G. H. Coons and Ezra Levin. June, 1917. A popular edition of Tech. Bul. 25.
82. Durability of concrete drain tile, II. By O. B. Winter. Dec., 1917.
83. Key to Orthoptera of Michigan with annotations. By R. H. Pettit and Eugenia McDaniel. Jan., 1918.
84. Strawberry culture. By C. P. Halligan. Feb., 1918.
85. Michigan potato diseases. By G. H. Coons. Mar., 1918.
86. Spray and practice outline for fruit growers. By C. P. Halligan and R. H. Pettit. Feb., 1918.
87. Dusting and spraying experiments with apples. By W. C. Dutton. Mar., 1918.
88. Spraying to control anthracnose [*Plectodiscella veneta*] on black raspberries. By W. C. Dutton. Mar., 1918.
89. Tomato growing in Michigan. By C. W. Waid.—[Insects. By R. H. Pettit.] Mar., 1918.
90. Special report of the Upper Peninsula experiment station: General information relating to the Upper Peninsula experiment station. By R. S. Shaw.—Report of the work of the Upper Peninsula station, including data for year ending June 30, 1918. By B. W. Householder. Oct., 1918.
91. Some general information on lime and its uses and functions in soils. By M. M. McCool and C. E. Millar. Dec., 1918.
92. Feeding value of skim milk for swine. By H. W. Norton, jr. Dec., 1918.
93. Spray and practice outline for fruit growers. By H. J. Eustace and R. H. Pettit. Feb., 1918. Supersedes Spec. Buls. 12, 15, 19, 26, 36, 45, 51, 54, 57, 61, 69, 73, 86.
94. The financial history of a twelve-year-old peach orchard. By H. J. Eustace and F. M. Barden. Feb., 1919.
95. Muskmelon culture in Michigan. By C. W. Waid. Feb., 1919.
96. Analyses of insecticides and fungicides. By A. J. Patten and E. F. Berger. May, 1919.
97. Alfalfa in Michigan. By J. F. Cox. June, 1919.
98. Vinegar. By Zae N. Wyant. Nov., 1919.
99. The Detroit commission plan of city milk administration. By W. O. Hedrick and A. C. Anderson. Nov., 1919.
100. Soy beans. By C. R. Megee. Mar., 1920.
101. Oats in Michigan. By J. F. Cox. Mar., 1920.
102. Dusting and spraying experiments of 1918 and 1919. By W. C. Dutton. Mar., 1920.
- 105 [i. e. 103]. Forest planting in Michigan. By A. K. Chittenden. Feb., 1921.
104. Soils of the Detroit area. By M. M. McCool and G. M. Grantham. Nov., 1920.

## TECHNICAL BULLETINS.

1. Keeping qualities of butter: I, General studies. By W. S. Sayer, O. H. Rahn, and Bell Farrand. June, 1908.
2. Keeping qualities of butter: II, The influence of salt; III, the decomposition of proteins. By Otto Rahn, C. W. Brown, and L. M. Smith. Sept., 1909.
3. Studies of agglutination reactions in hog cholera during the process of serum production. (Preliminary.) By Ward Giltner. Oct., 1909.
4. Organic nitrogenous compounds in peat soils. By S. L. Jodidi. Nov., 1909.
5. The usefulness of curves in the interpretation of microbial and biochemical processes. By Otto Rahn. June, 1910.
6. Lime-sulphur spray. By J. E. Harris. Jan., 1911.
7. Organic nitrogenous compounds in peat soils, II. By C. S. Robinson. April, 1911.
8. Studies of agglutination reactions in hog cholera during the processes of serum production. By Ward Giltner. June, 1911.
9. The influence of the products of lactic organisms upon *Bacillus typhosus*. By Zae Northrup. June, 1911.
10. The fermenting capacity of the average single cell of *Bacterium lactis acidi*. By Otto Rahn. June, 1911.
11. How contact insecticides kill, I [and] II. By G. D. Shafer. July, 1911.
12. Neutral ammonium citrate solution. By A. J. Patten and C. S. Robinson. June, 1912.
13. What is the antigen responsible for the anti-bodies in Dorset-Niles serum? By Ward Giltner. June, 1912.
14. Infectious abortion and sterility of cattle. By Ward Giltner. June, 1912.

15. The influence of certain acid-destroying yeasts upon lactic bacteria. By Zae Northrup. June, 1912.
16. The bacterial activity in soil as a function of grain-size and moisture content. By Otto Rahn. June, 1912.
17. An investigation of soil temperature and some of the most important factors influencing it. By G. J. Bouyoucos. Feb., 1913.
18. A bacterial disease of June beetle larvae, *Lachnosterna* spp. By Zae Northrup. June, 1914.
19. Soil acidity. By J. E. Harris. July, 1914.
20. Experiments on the control of the root-knot nematode. By J. A. McClintock. July, 1915.
21. How contact insecticides kill: III, Relating evidence, further, of certain properties of carbon disulphide, gasoline, and a few other fluids, as well as temperature and some dry powdered contact insecticides, by means of which the insecticidal action of these agents is accomplished after their absorption into the insect tissues, or after mere application; including also brief suggestions for possible practice. By G. D. Shafer. July, 1915.
22. Effect of temperature on some of the most important physical processes in soils. By G. J. Bouyoucos. July, 1915.
23. A simplified apparatus for measuring the conductivity of electrolytes. By R. P. Hibbard and C. W. Chapman. Nov., 1915.
24. The freezing point method as a new means of measuring the concentration of the soil solution directly in the soil. By G. J. Bouyoucos and M. M. McCool. Dec., 1915.
25. The leaf-spot disease of tomato. By Ezra Levin, E. A. Bessey, and G. H. Coons. Mar., 1916. See Spec. Bul. 81.
26. Soil temperature. By G. J. Bouyoucos. Jan., 1916.
27. The freezing point method as a new means of determining the nature of acidity and lime requirements of soils. By G. J. Bouyoucos. Mar., 1916.
28. The soil solution obtained by the oil-pressure method. By J. F. Morgan. Oct., 1916.
29. Keeping qualities of butter: IV, Cream ripening and its influence (contribution), bacteria in cream, their numbers and types and their itinerary in the manufacture of butter. By C. W. Brown and Kurt Peiser. Oct., 1916.
30. Keeping qualities of butter: V, Pasteurization and its influence (contribution), a study of the factors which influence the resistance of lactic acid bacteria to heat. By C. W. Brown and Kurt Peiser. Oct., 1916.
31. Further studies on the freezing point lowering of soils. By G. J. Bouyoucos and M. M. McCool. Nov., 1916.
32. The transmission of *Bacterium abortus* (Bang) to new-born calves through the ingestion of milk. By I. F. Huddelson. Oct., 1916.
33. A study of the presence of *Bacterium abortus* (Bang) in milk. By L. H. Cooledge. Oct., 1916.
34. A study of the factors which govern mating in the honey bee. By G. D. Shafer. July, 1917.
35. Organic nitrogenous compounds in peat soils, III. By C. S. Robinson and E. J. Miller. Aug., 1917.
36. Classification and measurement of the different forms of water in the soil by means of the dilatometer method. By G. J. Bouyoucos. Sept., 1917.
37. The freezing point method as a new means of studying velocity of reaction between soils and chemical agents and behavior of equilibrium. By G. J. Bouyoucos and W. A. Landeman. Sept., 1917.
38. Experiments on the control of bean anthracnose and bean blight. By J. H. Muncie. Dec., 1917.
39. Soil solution as an index of the biological changes in the soil. By J. F. Morgan. Sept., 1917.
40. Physiological balance in the soil solution. By R. P. Hibbard. Sept., 1917.
41. Studies upon the bacterial flora of samples of milk with high cellular counts as drawn from apparently normal udders. By L. H. Cooledge. Jan., 1918.
42. Relationship between the unfree water and the heat of wetting of soils and its significance. By G. J. Bouyoucos. Mar., 1918.
43. Soluble salt content of soils and some factors affecting it. By M. M. McCool and C. E. Millar. Nov., 1918.
44. Rate and extent of solubility of soils under different treatments and conditions. By G. J. Bouyoucos. June, 1919.
45. The effect of fertilizer salts treatments on the composition of soil extracts. By C. H. Spurway. Aug., 1919.
46. The use of solutions of ammonium citrate for the estimation of reverted calcium phosphate. By C. S. Robinson. Oct., 1919.
47. Studies in the heat resistant organisms of cold-packed canned peas. By Ruth Normington, under the direction of Ward Giltner and Zae N. Wyant. Nov., 1919.
48. The Lecania of Michigan. By R. H. Pettit and Eugenia McDaniel. Mar., 1920.
49. Studies in infectious abortion: 1, On the presence *Bacterium abortus* in the deeper of layers of the mucous membrane of the nongravid uterus; 2, a few notes on the isolation and cultivation of *Bacterium abortus* with special reference to liver and spleen media; 3, on the possibility of differentiating between infected and immune animals in infectious abortion. By H. J. Stafseth.—4, The isolation of *Bacterium abortus* from milk. By I. F. Huddelson. Nov., 1920.

## MINNESOTA.

Agricultural Experiment Station of the University of Minnesota, University Farm, St. Paul.

## BULLETINS.

1. Reports on Russian apples; wheat experiments and potato culture. By E. D. Porter. Jan., 1888.
2. Silos and ensilage: tests of varieties of corn for feeding values: examination of beets and other roots for sugar and feeding value. By E. D. Porter and J. A. Dodge. Apr., 1888.
3. Our Russian apples at the opening of their fourth season: natural and artificial fertilization of plants. By S. B. Green.—Report on Rocky Mountain locusts in Otter Tail County, Minn., in 1888. By Otto Luggler. July, 1888.
4. Comparative value of cold and warm water for stock in food consumed and in the production of milk, butter, and beef. By E. D. Porter.—Fungi which kill insects, especially as affecting chinch bugs and locusts. By Otto Luggler.—“Tuberculosis” or consumption in domestic animals. By M. J. Treacy. Oct., 1888.
5. Indian corn: Habits of root growth; methods of planting and cultivation; notes on ears and suckers. By W. M. Hays.—Propagation of Russian willows and poplars from hardwood cuttings; native plums; comparative tests of varieties of cabbage. By S. B. Green.—New method of potato culture. By Charles Pomerouille.—Frosted and rusted wheat. By Otto Luggler. Jan., 1889.
6. Experiments with frosted, rusted, and stack burned wheat: Notes on the effects of frost and rust on the germination of wheat. By E. D. Porter.—Experiments in germination and growth of damaged wheat and barley. By S. B. Green. Feb., 1889.



7. Soil temperatures; comparative tests of varieties of corn for ensilage; warm and cold water for stock. By E. D. Porter.—Selection and cross fertilization of corn. By W. M. Hays.—Washing and salting butter. By W. M. Hays and D. N. Harper.—Construction of green-house walls; comparative tests of varieties of potatoes. By S. B. Green.—The chemistry of wheat under various conditions. By D. N. Harper.—Influence of food upon the formation of the skull and teeth of pigs. By Olaf Schwartzkopf. Apr., 1889.
8. Siloing clover. By N. W. McLain.—Sources of homemade manures. By W. M. Hays.—The by-products of wheat. By W. M. Hays and D. N. Harper.—The Rocky Mountain locust in Otter Tail County, Minn., in 1889. July, 1889.
9. Russian willows and poplars—descriptions and value for Minnesota. By S. B. Green.—Insects affecting poplars and willows. By Otto Luggler. Nov., 1889.
10. Onions on land plowed and unplowed; trial of cabbage; syringing with London purple to kill the curculio on our native plums; bagging grapes; rolling-stone plums; potatoes at different depths. By S. B. Green.—Oak caterpillars. By Otto Luggler. Mar., 1890.
11. Pruning the roots of corn: Deep versus shallow cultivation; improving corn: Cross fertilization and selection; peas, beans, flax, and other crops. By W. M. Hays.—Results of seeding rusted, frosted, and frozen wheat of 1888: Further observations. By D. N. Harper. June, 1890.
12. Meadows and pastures in Minnesota. By W. M. Hays.—American-grown cauliflower seed; preserving vegetables in carbonic acid gas. By S. B. Green.—Protection from frost. By H. A. Hazen. July, 1890.
13. A treatise on flax culture. By Otto Luggler and H. L. Osborn. Dec., 1890.
14. Swine feeding for profit; swine breeding. By N. W. McLain.—Sugar beets: Their cultivation, the process of manufacture, etc. By D. N. Harper and W. M. Hays. Jan., 1891.
15. Wheat: A comparison of foreign and native varieties, the selection and changing of seed, etc. By D. N. Harper. Feb., 1891.
16. Sheep scab and how to cure it. By Otto Luggler. Apr., 1891.
17. Migratory locusts in Minnesota in 1891. By Otto Luggler. Aug., 1891.
18. Notes on strawberries and raspberries, 1891; notes on sand cherries, buffalo berry, and Russian mulberry; evergreens from seed; summer propagation of hardy plants. By S. B. Green. Sept., 1891.
19. Dehorning experiment. By C. D. Smith and T. L. Haecker.—[A double monstrosity of a calf traceable to injury of its mother. By Olaf Schwartzkopf.]—Cream raising by cold deep setting; experiments in cheese making. By Harry Snyder.—The Babcock test and churn. By C. D. Smith and T. L. Haecker. Mar., 1892.
20. Fertilizers. By W. M. Hays and D. N. Harper.—Improvement of timothy; rape in Minnesota; peas and oats; field peas. By W. M. Hays. May, 1892.
21. Sugar beets. By D. N. Harper and W. M. Hays.—Sorghum. By D. N. Harper. June, 1892.
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25. Report on small fruit; notes from trial stations; notes on renewing old strawberry beds; shading strawberry beds; seedling fruits; analyses of grapes; spraying grapevines. [By S. B. Green and others.] Dec., 1892.
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60. Beef cattle and swine. By Thomas Shaw. July, 1898.
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95. Some common weeds and their eradication. By A. D. Wilson. Mar., 1906. See 129.
96. Ornamental trees, shrubs, and herbaceous plants in Minnesota. By S. B. Green. Apr., 1906. A revision of 24.
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181. Studies on Fusarium diseases of potatoes and truck crops in Minnesota. By G. R. Bisby. Mar., 1919.
182. Breeding small grains in Minnesota: Technic and results with wheat and oats. By H. K. Hayes and R. J. Garber.—Barley investigations. By H. V. Harlan and H. K. Hayes. Mar., 1919.
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184. Farmers' cooperation in Minnesota, 1913-1917. By J. D. Black and Frank Robotka. Aug., 1919.
185. Cider and vinegar making qualities of Minnesota apples. By W. G. Brierly. Aug., 1919.
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193. Investigations in beef production: The composition of steers at the various stages of growth and fattening; the relation of feed nutrients consumed to substance stored in the body during various stages of growth and fattening; nutrient requirements for beef production based upon digestible nutrients. By T. L. Haecker. Sept., 1920.
194. Report of the Golden Valley peat experimental fields, 1918 and 1919. By F. J. Alway. Nov., 1920.

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## Mississippi Agricultural Experiment Station, Agricultural College.

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1. Organization. By S. M. Tracy. Mar. 21, 1888.
2. Cotton worm (*Aletia argillacea*). By S. M. Tracy. May 20, 1888.
3. Analyses of commercial fertilizers sold in Mississippi during the season 1887-88. By J. A. Myers. June 20, 1888.
4. The marls of Mississippi. By W. L. Hutchinson. Nov. 7, 1888.
5. Fertilizers. By S. M. Tracy. May 20, 1889.
6. Charbon. By S. M. Tracy. June 25, 1889.
7. Hay presses. By S. M. Tracy. June 20, 1889.
8. Stock feeding. By B. Irby. Aug. 30, 1889.
9. Some entozoid diseases of sheep and calves; bitterweed [*Helenium autumnale*]. By D. L. Phares. Aug. 30, 1889.
10. Dishorning. By D. L. Phares. Oct. 10, 1889.
11. Charbon (*Bacillus anthracis*). By G. C. Creelman. Feb. 15, 1890.
12. Cotton leaf worm (*Aletia argillacea*). By S. M. Tracy. June 25, 1890.
13. Feeding for milk and butter. By E. R. Lloyd. Sept. 25, 1890.
14. Injurious insects. By H. E. Weed. Mar., 1891.
15. Feeding. By E. R. Lloyd.—Milk-testing apparatus. By L. G. Patterson. June, 1891.
16. Glanders. By Tait Butler. Sept., 1891.
17. Insects injurious to stored grain. By H. E. Weed. Dec., 1891. Second edition, Oct., 1894.
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19. The southern tomato blight. By B. D. Haisted. Jan., 1892. Includes an article on bacterial melon blight which was also published in Bot. Gaz., 16 (1891), No. 11, p. 303-305.
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37. Fruits and vegetables on the Gulf Coast: Report of the Ocean Springs Branch Station. By F. S. Earle. Mar., 1896.
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41. The Colorado potato beetle in Mississippi. By H. E. Weed. Mar., 1897.
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70. Records of station cows; feeding dairy cows. By J. S. Moore. Dec., 1901.
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72. Anthrax. By J. C. Robert. Jan., 1902.
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85. Inspection and analyses of commercial fertilizers on sale in the State. By W. F. Hand [and others]. Oct., 1904.
86. Insects injurious to pecans. By G. W. Herrick. Nov., 1904.
87. Report of work at McNeill Branch Experiment Station for 1904. By E. B. Ferris. Jan., 1905.
88. Report of field work done at the college station for 1904. By W. R. Perkins. Jan., 1905.
89. The underground waters of Mississippi: A preliminary report. By W. N. Logan and W. R. Perkins. Jan., 1905.
90. The San José scale in Mississippi, and the lime-salt-sulphur wash. By G. W. Herrick. Aug., 1905.
91. Inspection and analyses of commercial fertilizers on sale in the State. By W. F. Hand [and others]. Sept., 1905.
92. Feeding beef cattle in Mississippi. By Archibald Smith and C. I. Bray. Aug., 1905.
93. Peach and plum culture. By A. B. McKay. Sept., 1905.
94. Report of work at McNeill Branch Station for 1905. By E. B. Ferris. Jan., 1906.
95. The dairy cow. By J. S. Moore. Apr., 1906.
96. Insects and diseases liable to be introduced into Mississippi. By G. W. Herrick. Feb., 1906.
97. Inspection and analyses of commercial fertilizers on sale in the State. Oct., 1906.
98. Varieties of cotton, 1905 and 1906. By W. R. Perkins. Jan., 1907.
99. Fertilizers. By E. B. Ferris. Jan., 1907.
100. Farmers' institute bulletin, 1906. By E. R. Lloyd [and others]. Dec., 1906.
101. Report of work at McNeill Branch Experiment Station for 1906. By E. B. Ferris. Jan., 1907.
102. How to control injurious insects and noxious plant diseases. By G. W. Herrick. Apr., 1907.
103. Farmers' institute bulletin, 1907: Corn improvement in Mississippi. By W. R. Perkins. July, 1907.
104. Inspection and analyses of cottonseed meal on sale in Mississippi. Aug., 1907.
105. Inspection and analyses of commercial fertilizers on sale in the State. Nov., 1907.
106. Report of work at the Delta Station for 1906. By J. W. Fox. Jan., 1908.
107. Pork production at the Delta Station. By J. W. Fox. Feb., 1908. Revised Feb., 1909.
108. Report of work at Holly Springs Branch Experiment Station, 1906. By C. T. Ames. Jan., 1907.
109. Farmers' institute bulletin; The adornment of rural school surroundings. By G. L. Clothier. Apr., 1908.
110. Report of the work at the Holly Springs Station for 1907. By C. T. Ames. Jan., 1908.
111. Experiments in feeding dairy cows. By J. S. Moore. Jan., 1908.
112. Silage vs. hulls and meal. By A. K. Risser and R. R. Welch. Apr., 1908.
113. Cotton experiments, 1907. By W. R. Perkins. June, 1908.
114. Inspection and analyses of cotton-seed meal on sale in Mississippi. Nov., 1908.
115. Inspection and analyses of commercial fertilizers on sale in the State. Nov., 1908.
116. Varieties of cotton, 1908. By W. R. Perkins. Nov., 1908.
117. Cotton culture in Mississippi in areas infested with the Mexican cotton boll weevil. By W. L. Hutchinson. Dec., 1908.
118. Clearing pine lands. By E. B. Ferris. Jan., 1909. See 159.
119. Report of work at the Delta Station for 1907-8. By J. W. Fox. Mar., 1907. [i. e. 1909?]
120. Farmers' institute bulletin 1907 and 1908. By E. R. Lloyd. Dec., 1908.
121. Experiments in feeding beef steers. By J. A. McLean. July 1909.
122. Report of the work at the Holly Springs Station for 1908. By C. T. Ames. July, 1909.
123. Inspection and analyses of commercial feeding stuffs on sale in the State. June, 1909.

124. Pecan culture. By G. L. Clothier. Oct., 1909.
125. Inspection and analyses of feeding stuffs on sale in the State. By W. F. Hand [and others]. Nov., 1909.
126. Inspection and analyses of commercial fertilizers on sale in the State. By W. F. Hand [and others]. Nov., 1909.
127. Inspection and analyses of cotton-seed meal on sale in Mississippi. By W. F. Hand [and others]. Dec., 1909.
128. Inspection and analyses of cotton-seed meal on sale in the State. By W. F. Hand [and others]. Apr., 1910.
129. Sugar cane for sirup making. By E. B. Ferris. Dec., 1909. See 199.
130. Peanuts. By E. B. Ferris. Dec., 1909.
131. Snap beans. By E. B. Ferris. Dec., 1909.
132. Soils of Mississippi: Soil management. By W. L. Hutchinson. Jan., 1910.
133. Inspection and analyses of commercial feeding stuffs. By W. F. Hand [and others]. Jan., 1910.
134. Broom corn. By W. R. Perkins. Jan., 1910.
135. Cotton, 1909. By W. R. Perkins. Jan., 1910.
136. Feeding beefsteers on cotton-seed meal, on pasture. By J. A. McLean. Mar., 1910.
137. Inspection and analyses of commercial feeding stuffs on sale in the State. Apr., 1910.
138. Inspection and analyses of commercial feeding stuffs on sale in the State. May, 1910.
139. Boll weevil in Mississippi, 1909. By R. W. Harned. Mar., 1910.
140. Cotton diseases in Mississippi. By R. P. Hibbard. July, 1910.
- 140B. Cotton diseases in Mississippi. By R. P. Hibbard. July, 1910.
141. Control of diseases of fruits, vegetables, and flowers. By H. C. Thompson. June, 1910.
142. The inspection and analyses of commercial fertilizers on sale in the State. Nov., 1910.
143. Inspection and analyses of cottonseed meal on sale in Mississippi. Dec., 1910.
144. Inspection and analyses of commercial feeding stuffs on sale in the State. Dec., 1910.
145. Inspection and analyses of commercial feeding stuffs on sale in the State. Dec., 1910.
146. Suggestions for growing home fruits. By A. B. McKay. Mar., 1911.
147. Apple growing in Mississippi. By H. C. Thompson. April, 1911.
148. The inspection and analyses of cotton-seed meal on sale in Mississippi. July, 1911.
149. Inspection and analyses of commercial feeding stuffs on sale in the State. Oct., 1911.
150. Inspection and analyses of commercial fertilizers on sale in the State. Oct., 1911.
151. The inspection and analyses of cottonseed meal on sale in the State. Nov., 1911.
152. Inspection and analyses of commercial feeding stuffs on sale in the State. Nov., 1911.
153. Inspection and analyses of commercial feeding stuffs on sale in the State. Nov., 1911.
154. Inspection and analyses of commercial feeding stuffs on sale in the State. Dec., 1911.
155. Recent cotton experiments: Results from the Central Experiment Station. By J. W. Fox, J. R. Ricks, and E. C. Ewing.—Results from the McNeill Experiment Station. By E. B. Ferris.—Results from the Holly Springs Branch Experiment Station. By C. T. Ames.—Results from Delta Branch Experiment Station. By G. B. Walker. Dec., 1911.
156. Inspection and analyses of cottonseed meal on sale in the State. Apr. 1912.
157. Report of work at the Delta Branch Experiment Station for 1911. By G. B. Walker. Feb., 1912.
158. Report of work at McNeill Branch Experiment Station for years 1907 to 1911, inclusive. By E. B. Ferris. Jan., 1912.
159. Clearing pine lands. By E. B. Ferris. Jan., 1912. A revision of 118.
160. The cut-over lands of south Mississippi. By E. B. Ferris. Jan., 1912.
161. Cotton experiments, 1912: Results from the Central Station. By J. R. Ricks and E. C. Ewing.—Results from McNeill Branch Station, 1912. E. B. Ferris.—Results from Holly Springs Branch Station. By C. T. Ames.—Results from the Delta Branch Station. By G. B. Walker.
162. Cotton seed meal as a feed for laying hens. By J. K. Morrison. Sept., 1913.
163. Truck crops for south Mississippi. By E. B. Ferris. 1913.
164. Cotton experiments, 1913: Results from the Central Station. By J. R. Ricks.—Results from McNeill Branch Experiment Station, 1913. By E. B. Ferris.—Holly Springs Branch Experiment Station. By C. T. Ames.—Results from the Delta Branch Station. By G. B. Walker. Feb., 1914.
165. Report of the work done at Holly Springs Branch Experiment Station, 1913. By C. T. Ames. Jan., 1914.
166. Dairying on cut-over pine lands. By E. B. Ferris. 1913.
167. Corn silage compared with hulls for fattening steers. By E. R. Lloyd. Oct., 1914.
168. Bacteriological effects of green manures. By C. F. Briscoe and H. H. Harned. Jan., 1915. See 185.
169. Cotton experiments, 1914: Results from the Central Station. By E. C. Ewing and J. R. Ricks.—Results from the Holly Springs Branch Experiment Station. By C. T. Ames.—Results from the Delta Branch Station. By G. B. Walker. Dec., 1914.
170. Corn: Results from Central Station. By J. R. Ricks.—Holly Springs Branch Experiment Station, four years' results. By C. T. Ames.—Treatment for weevils in stored grain. By R. W. Harned. Jan., 1915.
171. Experiments with small grains. By J. R. Ricks.—Treatment for weevils in stored grain. By R. W. Harned. Jan., 1915.
172. Forage crops. By J. R. Ricks. Jan., 1915.
173. Cotton experiments, 1915. By H. B. Brown [and others]. Jan., 1916.
174. I, Feeding cottonseed meal and hulls to dairy cows; II, feeding value of cottonseed meal versus cold-pressed cottonseed cake; III, feeding value of purchased feeds versus pasture versus soiling crops. By J. S. Moore. 1914 [i. e. 1916?].
175. Cottonseed meal, a good feed for laying hens. By E. P. Clayton. Aug., 1916.
176. The economy of mule production in the South and methods of management. By H. K. Gayle and E. R. Lloyd. Apr., 1916.
177. Some experiments and practical demonstrations in hog feeding at the Delta Branch Experiment Station. By G. B. Walker. Aug., 1916.
178. Cotton experiments, 1916. By J. R. Ricks [and others]. Dec., 1916.
179. Velvet beans in Mississippi. By E. B. Ferris. Aug., 1917.
180. Pasture and forage crops for south Mississippi. By E. B. Ferris. Aug., 1917.
181. Emergency cow feeds. By H. K. Gayle. Aug., 1917.
182. Silages for fattening steers. By H. K. Gayle and E. R. Lloyd. June, 1917.
183. Baby beef and calf feeding. By H. K. Gayle. Sept., 1917.
184. Cotton experiments, 1917. By H. B. Brown and C. T. Ames. Feb., 1918.
185. Bacteriological effects of green manure, Study No. II. By C. F. Briscoe and H. H. Harned. July, 1918. Includes in summary results previously published in 168.
186. Cotton experiments, 1918. By H. B. Brown. Mar., 1919.
187. Cotton experiments, 1919 and 1920. By H. B. Brown and C. B. Anders. Dec., 1920.
188. A report of work at McNeill Branch Experiment Station from 1912 to 1917 inclusive. By E. B. Ferris. Dec., 1920.

189. Corn at Holly Springs Branch Experiment Station. By C. T. Ames. Dec., 15, 1921.
190. Diseases of the sweet potato in Mississippi and their control. By D. C. Neal. Dec. 15, 1920.
191. The mosaic disease of sugar cane in Mississippi in 1920. By L. E. Miles. Dec., 1920.
192. Report of cotton experiments at the Holly Springs Branch Experiment Station, seasons 1919 and 1920. By C. T. Ames. Dec., 1920.
193. Report from Holly Springs Branch Experiment Station for 1915 to 1920, inclusive. By C. T. Ames. Dec., 1920.
194. Report from South Mississippi Branch Experiment Station for 1918 to 1920, inclusive. By E. B. Ferris. Dec., 1920.
195. Experiments in dusting and spraying peaches for the control of curculio, brown rot, and scab. By O. I. Snapp and Leslie Pierce. Dec., 1920.
196. Cotton growing in south Mississippi. By E. B. Ferris. Dec., 1920.

## TECHNICAL BULLETINS.

1. A chemical study of the cotton plant. By W. L. Hutchinson and L. G. Patterson. Dec., 1892.
2. Some scale insects of Mississippi with notes on certain species from Texas. By G. W. Herrick. Feb., 1911.
3. Form and structure of certain plant hybrids in comparison with the form and structure of their parents. By H. B. Brown. Jan., 1913.
4. The soils of Mississippi. By W. N. Logan. 1913. See Tech. Bul. 7.
5. Sero-diagnosis of pregnancy in mares. By C. F. Briscoe and E. M. Ranck. 1914.
6. Forage poisoning due to *Claviceps paspali* on paspalum. By H. B. Brown and E. M. Ranck. Feb., 1915.
7. The soils of Mississippi. By W. N. Logan. 1916. A revision of Tech. Bul. 4.
8. A study of certain environmental factors and varietal differences influencing the fruiting of cotton. By F. C. Ewing. June, 1918.
9. North American Iridae of the subfamily Micracinae, with descriptions of new species and genera. By M. W. Blackman. Dec., 1920.

## MISSOURI.

## Missouri Agricultural Experiment Station, Columbia.

## BULLETINS.

The first 35 bulletins of this list, 1883-1888, were issued as publications of the College of Agriculture of the University of Missouri. Bulletin 35 of the series is the same as Experiment Station Bulletin 2.

1. [Experiment with pigs.] By J. W. Sanborn. Jan., 1883.
2. Feeding steers. By J. W. Sanborn. Apr., 1883.
3. Report of test of varieties of wheat and corn. By J. W. Sanborn. [1883?]
4. Mulching. By J. W. Sanborn. Oct., 1883.
5. Relation of tillage to soil moisture. By J. W. Sanborn. Nov., 1883.
6. Relation of dew to soil moisture. By J. W. Sanborn. Dec., 1883.
7. Feeding wheat and corn. By J. W. Sanborn. Feb., 1884.
8. Meal feeding stock at pasture. By J. W. Sanborn. Mar., 1884.
9. Grass-fed pigs. By J. W. Sanborn. May, 1884.
10. Pig feeding experiments. By J. W. Sanborn. 1884.
11. [Value of corn fodder as stock food.] By J. W. Sanborn. 1884.
12. [Seed potatoes.] By J. W. Sanborn. 1884.
13. Good roads and broad wheel tires. By J. W. Sanborn. 1885.
14. Feeding for lean meat. By J. W. Sanborn. Feb., 1885.
15. Contagious pleuro-pneumonia. By Paul Paquin. 1885.
16. Glanders: Second report of the State veterinarian. By Paul Paquin. 1885.
17. General observations [on forage crops]. By J. W. Sanborn. 1885.
18. Subsoiling. By J. W. Sanborn. 1885.
19. Feeding for lean meat. By J. W. Sanborn. 1886.
20. Report of investigations and observations in the horticultural department. By L. R. Taft. 1886.
21. Plants and their uses. By S. M. Tracy. 1886.
22. Corn harvesting. By J. W. Sanborn. 1886.
23. Relation of dew to soil moisture. By J. W. Sanborn. 1886.
24. Contagious diseases and their prevention. By Paul Paquin. 1886.
25. Shrinkage of hay in stacks; distance of planting corn; test of varieties. By J. W. Sanborn. 1886.
26. [Fruits and vegetables: Variety tests.] By L. R. Taft. 1887.
27. Feeding for flesh. By J. W. Sanborn. 1887.
28. Maintenance rations for pigs. By J. W. Sanborn. 1887.
29. Rotation of crops. By J. W. Sanborn. 1887.
30. Fertilization. By J. W. Sanborn. 1887.
31. Texas fever and other diseases. By Paul Paquin. 1887.
32. Plows and plowing. By J. W. Sanborn. 1888.
33. Glanders, mad itch of cattle, etc. By Paul Paquin. 1888.
34. Experimental farming. By J. W. Sanborn. 1888.
35. Same as 2 of the next series.
1. Announcement to farmers; the so-called "Hatch bill;" assent of governor; plans of organization; work and experiments proposed this season; personnel of station. By Paul Schweitzer. 1888.
2. Grasses for pastures and meadows. By J. W. Sanborn. 1888.
3. Generalities and experiments in spaying cattle (to be continued); appendix on glanders. By Paul Paquin. [1888.]
4. A test of tillage implements. By J. W. Sanborn. Dec., 1888.
5. Soil, weather, field trials with corn. By Paul Schweitzer. Feb., 1889.
6. Experiments on seed germination, pea weevil, and apples. By J. W. Clark. [1889?].
7. Green versus dry storage of fodder. [By J. W. Sanborn] [1889?].
8. Experiments on feeding ensilage against dry fodder. By J. W. Sanborn. [1889?].
9. Study of the life history of corn at its different periods of growth. By Paul Schweitzer. Dec., 1889.
10. Analyses of apples at various stages of growth; Bordeaux mixture for grape rot; comparative tests of small fruits and potatoes. By J. W. Clark. Apr., 1890.
11. Texas fever, investigations between September, 1888, and March, 1889 [i. e., 1890]. By Paul Paquin. May, 1890.
12. Black leg. By Paul Paquin. June, 1890.

13. Reports on spraying for the codling moth, apple scab, and black rot of the grape; reports on strawberries, raspberries, blackberries, tomatoes, peas, and potatoes; list of new fruit received for testing. By J. W. Clark. Jan., 1891.
14. Field experiments with corn. By H. J. Waters. Apr., 1891.
15. Wheat, test of varieties, 1889, 1891; oats, test of varieties, 1889, 1891; change of seed: wheat, oats, and potatoes. By H. J. Waters. July, 1891.
16. Covering peach trees to protect the fruit buds; spread of pear blight; temperature and rain tables; strawberry tests; potato trials; seedling fruits. By J. W. Clark. Nov., 1891.
17. Sugar beets. By C. P. Fox. Jan., 1892.
18. Strawberries. By C. A. Keffer. Aug., 1892.
19. Soils and fertilizers, Pt. I. By Paul Schweitzer. Oct., 1892.
20. Soils and fertilizers, Pt. II. By Paul Schweitzer. Jan., 1893.
21. Field experiments with wheat. By C. M. Conner. Apr., 1893 [i. e., Jan., 1896].
22. Seeding strawberries. By C. A. Keffer. July, 1893.
23. Grape culture. By C. A. Keffer. Oct., 1893.
24. Comparative tests of different breeds of beef cattle. By Paul Schweitzer. Jan., 1894 [i. e., June, 1895].
25. An inquiry into the composition of the flesh of cattle. By Paul Schweitzer. Apr., 1894.
26. Dairy management. By A. M. Soule. July, 1894 [i. e., Mar., 1895].
27. Spraying apple trees for destruction of insects and prevention of fungous diseases. By C. A. Keffer. Oct., 1894.
28. Feeding tests with different breeds of beef cattle. By Paul Schweitzer. Jan., 1895 [i. e., Aug., 1895].
29. Feeding wheat to pigs. By Paul Schweitzer. Apr., 1895.
30. Spray calendar. By E. G. Lodeman. Apr., 1895.
31. Spraying orchards and vineyards. By J. C. Whitten. July, 1895.
32. Field experiments with corn. By H. J. Waters and C. M. Conner. Oct., 1895.
33. Inquiry into the principles of potato growing and tests of varieties. By Paul Schweitzer. Jan., 1896.
34. Manures and fertilizers. By H. J. Waters. Apr., 1896.
35. The woolly-aphis of the apple. By J. M. Stedman. Oct., 1896.
36. The lesser apple leaf folder; the leafcrumpler. By J. M. Stedman. Oct., 1896.
37. Texas fever. By J. W. Connaway. Jan., 1897.
38. Winter protection of the peach; peach growing in Missouri. By J. C. Whitten. Apr., 1897.
39. Influence of width of tire on draft of wagons. By H. J. Waters. July, 1897.
40. The sugar beet. By H. J. Waters. Oct., 1897.
41. The San José scale in Missouri. By J. M. Stedman. Jan., 1898.
42. A new orchard pest: The fringed-winged apple-bud moth. By J. M. Stedman. Apr., 1898.
43. Winter forcing of asparagus in the open field; asparagus culture for Missouri. By J. C. Whitten. May, 1898.
44. The fruit-tree bark-beetle; the common apple-tree and peach-tree borers. By J. M. Stedman. Oct., 1898.
45. The sugar beet. By H. J. Waters. Jan., 1899.
46. The grape. By J. C. Whitten. Apr., 1899.
47. The tarnished plant bug. By J. M. Stedman. July, 1899.
48. Texas fever: Immunizing northern breeding cattle for the southern trade (1) by serum inoculation, (2) by tick infestation, (3) by blood inoculation. By J. W. Connaway and M. Francis. Oct., 1899.
49. The apple orchard. By J. C. Whitten. Jan., 1900.
50. A test of spray nozzles. By N. O. Booth. Apr., 1900.
51. The chinch bug. By J. M. Stedman. July, 1902.
52. Influence of height of wheel on the draft of farm wagons. By T. I. Mairs. Oct., 1901.
53. Breeding experiments with sheep. By F. B. Mumford. Nov., 1901.
54. The strawberry false worm; the strawberry leaf roller. By J. M. Stedman. Dec., 1901.
55. Pruning peach trees. By J. C. Whitten. Jan., 1902.
56. Dairy husbandry. By H. J. Waters and C. H. Eckles. Jan., 1902.
57. Raising calves with skim milk. By C. H. Eckles. Apr., 1902.
58. Feeding the dairy cow. By C. H. Eckles. July, 1902.
59. Corn improvement for Missouri. By G. M. Tucker. Oct., 1902.
60. A new Bordeaux powder. By R. M. Bird. Jan., 1903.
61. Apple growing in Missouri. By J. C. Whitten. May, 1903.
62. Hessian fly in Missouri. By J. M. Stedman. June, 1903.
63. Commercial fertilizers. By F. B. Mumford and Paul Schweitzer. Feb., 1904.
64. The "sting" in the apple, the work of the plum curculio [*Cenotrachelus nenuphar* Hbst.] in the apple. By J. M. Stedman. July, 1904.
65. Grain rations for dry lot hog feeding. By E. B. Forbes. Feb., 1905.
66. Analyses of commercial fertilizers. By Paul Schweitzer and R. M. Bird. Dec., 1904.
67. Supplements to corn for fattening hogs. By E. B. Forbes. Apr., 1905.
68. A test of tin can separators; a test of a fly repellent. By C. H. Eckles. July, 1905.
69. Three fungous diseases of the cultivated ginseng. By H. S. Reed. Oct., 1905.
70. Analyses of commercial fertilizers. By Paul Schweitzer and R. M. Bird. Dec., 1905.
71. The fruit-tree leaf roller. By J. M. Stedman. Apr., 1906.
72. Alfalfa growing in Missouri. By M. F. Miller. July, 1906.
73. Cowpeas. By A. E. Grantham. Oct., 1906.
74. The winter killing of peach buds as influenced by previous treatment. By W. H. Chandler. Jan., 1907.
75. Wintering yearling cattle. By H. J. Waters. Apr., 1907.
76. Fattening cattle for the market. By H. J. Waters. Dec., 1907.
77. Inspection of commercial fertilizers [in 1906]. By H. J. Waters. [1907?]
78. Inspection of commercial fertilizers [in 1907]. By P. F. Trowbridge. Jan., 1908.
79. Green forage for hogs. By H. J. Waters. Mar., 1908.
80. Inspection of commercial fertilizers. By P. F. Trowbridge. June, 1908.
81. Specific effects of rations on the development of swine. By E. B. Forbes. Dec., 1909. Published also as Ohio Sta. Bul. 213.
82. Inspection of commercial fertilizers [in 1908]. By P. F. Trowbridge. [n. d.]
83. Soil experiments on the upland loam of southeast Missouri (Jefferson County). By M. F. Miller and C. B. Hutchison. Jan., 1910.
84. Soil experiments on the prairie silt loam of southwest Missouri. By M. F. Miller and C. B. Hutchison. Jan., 1910.
85. Inspection of commercial fertilizers. By P. F. Trowbridge. Jan., 1910.
86. Soil experiments on the rolling limestone upland of southwest Missouri. By M. F. Miller and C. B. Hutchison. Mar., 1910.
87. Cooperative variety tests of corn; variety tests of corn at Columbia. By M. F. Miller and H. D. Hughes. May, 1910.



88. Soil management in the Ozark region. By M. F. Miller. July, 1910.
89. Forest conditions of the Ozark region of Missouri. By S. J. Record. Nov., 1910.
90. Fattening cattle on blue grass pasture. By F. B. Mumford. Jan., 1911.
91. Inspection of commercial fertilizers. By F. B. Mumford [and others]. Feb., 1911.
92. The soils of Sullivan County. By R. C. Doneghue [and others]. Feb., 1911.
93. The soils of Audrain County. By R. C. Doneghue and B. W. Tillman. Feb., 1911.
94. Factors affecting the per cent of fat in cream from farm separators. By C. H. Eckles and H. S. Wayman. Feb., 1911.
95. Pork production with forage crops: Clover, alfalfa, rape, corn, rye grain, cowpeas, soy beans, sorghum. By F. B. Mumford and C. A. Willson. Feb., 1911.
96. Report of the director for the year ending June 30, 1910. By F. B. Mumford. Feb., 1911.
97. Cooperation among fruit growers. By W. H. Chandler. July, 1911.
98. The San José scale in Missouri. By Leonard Haseman. Jan., 1912.
99. Inspection and analyses of commercial fertilizers. By P. F. Trowbridge [and others]. Jan., 1912.
100. Influence of fatness of cow on per cent of fat in milk. By C. H. Eckles. Feb., 1912.
101. Report of the director for the year ending June 30, 1911. By F. B. Mumford. Mar., 1912.
102. Combating orchard and garden enemies. By W. H. Chandler. Apr., 1912.
103. The silo for Missouri farmers. By C. H. Eckles. May, 1912. Superseded by 133.
104. The evergreen bagworm. By Leonard Haseman. May, 1912.
105. Partial bibliography and index of the publications of the college of agriculture and the agricultural experiment station. By H. O. Severance. July, 1912.
106. Cooperative experiments with alfalfa. By M. F. Miller and C. B. Hutchison. Aug., 1912.
107. Farm poultry house construction. By H. L. Kempster. Oct., 1912.
108. Grass investigations in the Ozark upland: First report. By M. F. Miller and C. B. Hutchison. Feb., 1913.
109. Inspection of commercial fertilizers. By F. B. Mumford and P. F. Trowbridge. Feb., 1913.
110. Forage crop rotations for pork production. By F. B. Mumford and L. A. Weaver. Feb., 1913.
111. Report of the director for the year ending June 30, 1912. By F. B. Mumford. Feb., 1913.
112. Corn silage for fattening two-year-old steers. By H. O. Allison. May, 1913.
113. Commercial fertilizers for strawberries. By W. H. Chandler. Aug., 1913.
114. Corn versus oats for work mules. By E. A. Trowbridge. Oct., 1913.
115. Rations for fattening western yearling sheep. By F. B. Mumford, E. A. Trowbridge, and Howard Hackedorn. Nov., 1913.
116. Inspection and analyses of commercial fertilizers, 1913. By P. F. Trowbridge. Feb., 1914.
117. Report of the director for the year ending June 30, 1913. By F. B. Mumford. Feb., 1914.
118. Drainage investigations on the northeast Missouri prairie: First report. By M. F. Miller [and others]. May, 1914.
119. Soil investigations, Jasper County experiment field. By M. F. Miller and R. R. Hudelson. Oct., 1914.
120. Rations for breeding ewes. By Howard Hackedorn. Oct., 1914.
121. Land tenure. By O. R. Johnson and W. E. Foard. Dec., 1914.
122. The Missouri fertilizer law. By F. B. Mumford.—Inspection and analysis of commercial fertilizers, 1914. By P. F. Trowbridge. Jan., 1915.
123. Experiments with farm crops in southwest Missouri. By C. B. Hutchison and T. R. Douglass. Jan., 1915.
124. Profits from spraying twenty-five Missouri orchards in 1914. By W. L. Howard. Jan., 1915.
125. The cost of production on Missouri farms. By O. R. Johnson and W. E. Foard. Feb., 1915.
126. Soil experiments on the level prairies of northeast Missouri. By M. F. Miller, C. B. Hutchison, and R. R. Hudelson. Mar., 1915.
127. Soil experiments on the dark prairies of central and northeast Missouri. By M. F. Miller, C. B. Hutchison, and R. R. Hudelson. Mar., 1915.
128. Soil experiments on the rolling glacial land of north Missouri. By M. F. Miller, C. B. Hutchison, and R. R. Hudelson. Apr., 1915.
129. Soil experiments on the red limestone upland of southwest Missouri: Second report. By M. F. Miller, C. B. Hutchison, and R. R. Hudelson. Apr., 1915.
130. Soil experiments on the gray prairie of southwest Missouri: Second report. By M. F. Miller, C. B. Hutchison, and R. R. Hudelson. Apr., 1915.
131. Work and progress of the agricultural experiment station for the year ending June 30, 1914. By F. B. Mumford. Apr., 1915.
132. The control of the San José scale in Missouri. By Leonard Haseman. Apr., 1915.
133. The silo and its use. By C. H. Eckles. July, 1915. Supersedes 103.
134. Insect pests of field crops. By Leonard Haseman. June, 1915. See 170.
135. The ration and age of calving as factors influencing the growth and dairy qualities of cows. By C. H. Eckles. Sept., 1915.
136. Feeding wheat to fattening swine. By L. A. Weaver. Nov., 1915.
137. The periodical cicada in Missouri. By Leonard Haseman. Nov., 1915.
138. Farm bee-keeping. By E. E. Tyler and Leonard Haseman. Nov., 1915.
139. Inspection of commercial fertilizers, 1915. By F. B. Mumford and P. F. Trowbridge. Jan., 1916.
140. Size of farm business. By O. R. Johnson and W. E. Foard. Apr., 1916.
141. Work and progress of the agricultural experiment station for the year ended June 30, 1915. By F. B. Mumford. Apr., 1916.
142. Successful farm organization. By O. R. Johnson. June, 1916.
143. Variety tests of corn. By C. B. Hutchison and others. July, 1916.
144. Self-feeders for fattening swine, with directions for constructing a self-feeder, by E. W. Lehmann. Feb., 1917.
145. Inspection of commercial fertilizers, 1916. By P. F. Trowbridge. Feb., 1917.
146. Agricultural lime. By M. E. Miller and H. H. Krusekopf. Mar., 1917. See 171.
147. Work and progress of the agricultural experiment station for the year ended June 30, 1916. By F. B. Mumford. June, 1917.
148. Soil experiments on the Ozark upland. By M. F. Miller and F. L. Duley. July, 1917.
149. Preparation of corn for fattening two-year-old steers. By H. O. Allison. Aug., 1917.
150. Corn silage with and without shelled corn in rations for fattening steers. By H. O. Allison. Aug., 1917.
151. How the station works. [Annual report 1916-17.] By F. B. Mumford. Sept., 1917.
152. Cost of horse labor on the farm. By O. R. Johnson and R. M. Green. Mar., 1918.
153. The soils of Missouri. By M. F. Miller and H. H. Krusekopf.—Statistical data relating to Missouri agriculture. Mar., 1918.
154. Inspection of commercial fertilizers, 1917. By P. F. Trowbridge. Mar., 1918.
155. Meat scrap and sour milk for egg production. By H. L. Kempster and G. W. Hervey. June, 1918.
156. Milk production costs and milk prices. By R. M. Green, D. C. Wood, and A. C. Ragsdale. July, 1918.
157. Fertilizer trials; Wentzville experiment field (Putnam silt loam). By M. F. Miller and F. L. Dudley. July, 1918.

158. Winter rations for dairy heifers. By C. H. Eckles. Oct., 1918.  
 159. Profits from milk cows on general cornbelt farms. By O. R. Johnson and R. M. Green. Oct., 1918.  
 160. Inspection of commercial fertilizers, 1918. By F. B. Mumford and L. D. Haigh. Jan., 1919.  
 161. Combining dormant and first summer spray in apple orchards infested by San José scale. By T. J. Talbert. Jan., 1919.  
 162. Legumes, Sudan grass, and cereal crops for silage. By C. H. Eckles. Mar., 1919.  
 163. Work and progress of the agricultural experiment station for the year July 1, 1917, to June 30, 1918. By F. B. Mumford. May, 1919.  
 164. Capacities of silos and weights of silage. By C. H. Eckles, O. E. Reed, and J. B. Fitch. Aug., 1919. Published also as Kans. Sta. Bul. 222.  
 165. Cost of producing some Missouri farm crops. By O. R. Johnson and R. M. Green. Aug., 1919.  
 166. Handling farm manure. By F. L. Duley. Sept., 1919.  
 167. Renting land in Missouri: Share, share-cash, and cash systems with model forms of lease. By O. R. Johnson and R. M. Green. Feb., 1920.  
 168. Inspection of commercial fertilizers, 1919. By F. B. Mumford and L. D. Haigh. Jan., 1920.  
 169. Profitable tomato fertilizers. By J. T. Rosa, Jr. Mar., 1920.  
 170. Insect pests of field crops. By Leonard Haseman. Apr., 1920. A revision of Bul. 134.  
 171. Agricultural lime. By M. F. Miller and H. H. Krusekopf. June, 1920. A revision of 146.  
 172. Work and progress of the agricultural experiment station for the year July 1, 1918, to June 30, 1919. By F. B. Mumford, June, 1920.  
 173. Ashland community survey: An economic, social, and sanitary survey in Howard County, Missouri. By C. C. Taylor and E. W. Lehmann. July, 1920.  
 174. Hog cholera and immature corn. By J. W. Connaway. Sept., 1920.  
 175. Influence of capital on farm organization: I, In livestock section. By O. R. Johnson and R. M. Green. Oct., 1920.  
 176. Nursery and orchard insect pests. [By Leonard Haseman]. Oct., 1920.  
 177. An investigation of the dipping and fumigation of nursery stock. By K. C. Sullivan. Dec., 1920

## RESEARCH BULLETINS.

1. An experimental study of the rest period in plants: The winter rest. First report. By W. L. Howard. Apr., 1910.
2. A study of cause of wide variations in milk production by dairy cows. By C. H. Eckles and O. E. Reed. Apr., 1910.
3. Soils of the Ozark region: A preliminary report on the general character of the soils and the agriculture of the Missouri Ozarks. By C. F. Marbut. June, 1910.
4. Digestion trial with two Jersey cows on full ration and on maintenance. By C. H. Eckles. Oct., 1911.
5. Maintenance trials with five Jersey cows. By C. H. Eckles. Oct., 1911.
6. The distribution of farm labor. By O. R. Johnson. Feb., 1913.
7. Nutrients required for milk production. By C. H. Eckles. Oct., 1913.
8. The killing of plant tissue by low temperature. By W. H. Chandler. Dec., 1913.
9. Carotin, the principal natural yellow pigment of milk fat: I, Review of the literature concerning the yellow plant and animal pigments. By L. S. Palmer and C. H. Eckles. Apr., 1914.
10. Carotin, the principal natural yellow pigment of milk fat: II, Chemical and physiological relations of pigments of milk fat to the carotin and xanthophylls of green plants. By L. S. Palmer and C. H. Eckles. Apr., 1914.
11. Carotins, the principal natural yellow pigment of milk fat: III, The pigments of the body fat, corpus luteum and skin secretions of the cow. By L. S. Palmer and C. H. Eckles. Apr., 1914.
12. Carotin, the principal natural yellow pigment of milk fat: IV, (A), The yellow pigment of blood serum; (B) carotin and xanthophylls during digestion; (C) the pigments of human milk fat. By L. S. Palmer and C. H. Eckles. Apr., 1914.
13. Lactochrome, the yellow pigment of milk whey: Its probable identity with urochrome, the specific yellow pigment of normal urine. By L. S. Palmer and L. H. Cooledge. Apr., 1914.
14. Sap studies with horticultural plants. By W. H. Chandler. May, 1914.
15. An experimental study of the rest period in plants: The summer rest of bulbs and herbaceous perennials. Second report. By W. L. Howard. Apr., 1915.
16. An experimental study of the rest period in plants: Pot-grown woody plants. Third report. By W. L. Howard. Apr., 1915.
17. An experimental study of the rest period in plants: Seeds. Fourth report. By W. L. Howard. Apr., 1915.
18. The maintenance requirement of cattle as influenced by condition, plane of nutrition, age, season, time on maintenance, type, and size of animal. By P. F. Trowbridge, C. R. Moulton, and L. D. Haigh. June, 1915.
19. Studies of the timothy plant: I, The influence of maturity upon the yield, composition, digestibility, palatability and feeding value of timothy hay. By H. J. Waters. June, 1915.
20. Studies of timothy plant: II, The changes in the chemical composition of the timothy plant during growth and ripening, with a comparative study of the wheat plant. By P. F. Trowbridge, L. D. Haigh, and C. R. Moulton. June, 1915.
21. An experimental study of the rest period in plants: Physiological changes accompanying breaking of the rest period. Fifth report. By W. L. Howard. June, 1915.
22. Silage investigations: Normal temperatures and some factors influencing the quality of silage. By C. H. Eckles, O. I. Oshel, and D. M. McGruder. Mar., 1916.
23. The powdery mildews of Avena and Triticum. By G. M. Reed. June, 1916.
24. Influence of plane of nutrition of the cow upon the composition and properties of milk and butter fat: Influence of overfeeding. By C. H. Eckles and L. S. Palmer. May, 1916.
25. Influence of plane of nutrition of the cow upon the composition and properties of milk and butter fat: Influence of underfeeding. By C. H. Eckles and L. S. Palmer. Nov., 1916.
26. The nutrients required to develop the bovine fetus. By C. H. Eckles. Nov., 1916.
27. Effects of feeding cottonseed products on the composition and properties of butter: Influence of the character of the ration and quantity of cottonseed products. By C. H. Eckles and L. S. Palmer. Dec., 1916.
28. Effect of limited food supply on the growth of young beef animals. By P. F. Trowbridge, C. R. Moulton, and L. D. Haigh. June, 1918.
29. The tarnished plant bug and its injury to nursery stock (*Lygus pratensis* Linnaeus). By Leonard Haseman. July, 1918.
30. Composition of the beef animal and energy cost of fattening. By P. F. Trowbridge, C. R. Moulton and L. D. Haigh. Jan., 1919.
31. Some factors influencing the rate of growth and the size of dairy heifers at maturity. By C. H. Eckles and W. W. Swett. Aug., 1918.

32. Some factors favoring or opposing fruitfulness in apples: The effect of certain conditions and practices on the development and performance of the individual fruit spur. By C. C. Wiggins. Sept., 1918.
33. An investigation in transplanting. By J. C. Whitten. Jan., 1919.
34. The preservation of milk for chemical analysis. By L. S. Palmer and L. H. Cooledge. June, 1919.
35. A study of the birth weight of calves. By C. H. Eckles. Aug., 1919.
36. The normal growth of dairy cattle. By C. H. Eckles. Apr., 1920.
37. Varietal resistance and susceptibility of oats to powdery mildew, crown rust, and smuts. By G. M. Reed. July, 1920.
38. Composition of the bovine at birth. By L. D. Haigh, C. R. Moulton, and P. F. Trowbridge. Aug., 1920.
39. Bud selection with special reference to the apple and strawberry. By V. R. Gardner. Aug., 1920.
40. Seasonal changes in the chemical composition of apple spurs. By H. D. Hooker, jr. Sept., 1920.

## MONTANA.

## Montana Agricultural Experiment Station, Bozeman.

## BULLETINS.

1. Organization; announcements. By S. M. Emery. Mar., 1894.
2. Smuts of wheat, oats, and barley. By Luther Foster. May, 1894.
3. Pig feeding. By Luther Foster. June, 1894.
4. Glanders. By W. L. Williams. June, 1894.
5. First annual report [1894]. [By S. M. Emery and others].—Crop statistics of Gallatin County, Montana. Feb., 1895.
6. Measurement of water. By A. M. Ryon. June, 1895.
7. Small grains and potatoes. By Luther Foster. June, 1895.
8. Second annual report [1895]. [By S. M. Emery and others].—Crop statistics of Gallatin County.—Bulletin of progress upon the parasitic ictero-haematuria of sheep. By W. L. Williams. July, 1895.
9. Potatoes. By Luther Foster. Apr., 1896.
10. Small grains: Wheat, oats and barley. By Luther Foster. June, 1896.
11. Devices for obtaining a constant flow in laterals with variable heads in the main canals or reservoirs. By A. M. Ryon. June, 1896.
12. Third annual report [1896]. [By S. M. Emery and others].—Bulletin on the spaying of mares. By W. L. Williams. Sept., 1896.
13. Drinking water. By F. W. Traphagen. Feb., 1897.
14. Montana swine feeding. By Frank Beach. Apr., 1897.
15. Larkspur poisoning of sheep. By E. V. Wilcox. July, 1897.
16. Fourth annual report [1897]. By S. M. Emery. Feb., 1898.
17. The grain aphid; an army cutworm. By E. V. Wilcox. Apr., 1898.
18. The alkali soils of Montana: Preliminary bulletin. By F. W. Traphagen. June, 1898.
19. The sugar beet in Montana. By F. W. Traphagen. Oct., 1898.
20. Fifth annual report, 1898. By S. M. Emery. Aug., 1898.
21. Sheep feeding. By R. S. Shaw. May, 1899.
22. The resistance of strawberries to frost; potato scab; treatment of seed oats for smut; losses caused by the grain aphid; roup of chickens; the internal chicken mite; lupines as plants poisonous to stock; cattle poisoning by the tall larkspur; poisoning of stock by the water hemlock; ergotism in horses; the poisoning of cattle by smutty oat hay; list of plants of known or suspected poisonous properties which occur within the State; some native forage plants of the State. By E. V. Wilcox. June, 1899.
23. Injurious fruit insects; insecticides; insecticide apparatus. By R. A. Cooley. May, 1900.
24. Sixth annual report [1899]. By S. M. Emery. July, 1899.
25. Paris green and London purple in Montana. By F. W. Traphagen. Apr., 1900.
26. Poultry raising. By H. C. Gardiner. Apr., 1900.
27. Live stock feeding tests; beef cattle, lambs, and swine. By R. S. Shaw. Apr., 1900.
28. Seventh annual report [1900]. By S. M. Emery. July, 1900. Contains index and Buls. 1-28.
29. The quantity of water used in irrigation and the seepage loss from canals. By Samuel Fortier. Nov., 1900.
30. Weeds of Montana. By J. W. Blankinship. June, 1901.
31. Report of grazing and feeding tests: Beef cattle and lambs. By R. S. Shaw. June, 1901.
32. Eighth annual report [1901]. By Samuel Fortier. Jan. 1902.
33. Sugar beets in Montana, the crop of 1901. By F. W. Traphagen. Jan., 1902.
34. Farmers' weirs: One method of measuring water. By Samuel Fortier. Feb., 1902. See 72.
35. Report of feeding tests: Beef cattle and sheep. By R. S. Shaw. May, 1902.
36. Forage conditions of central Montana. By F. A. Spragg. June, 1902.
37. Pork production in Montana. By R. S. Shaw. Sept., 1902.
38. Food adulteration. By F. W. Traphagen. Oct., 1902.
39. Sheep feeding in Montana. By R. S. Shaw. Nov., 1902.
40. Root crops in Montana. By R. S. Shaw. Nov., 1902.
41. Sugar beets, the crop of 1902. By F. W. Traphagen. Dec., 1902.
42. The codling moth. By R. A. Cooley. Dec., 1902.
43. Duty of water in Montana. By Samuel Fortier. Jan., 1903.
44. Apple growing in Montana. By R. W. Fisher. Feb., 1903.
45. The loco and some other poisonous plants in Montana. By J. W. Blankinship. June, 1903.
46. Two insect pests. By R. A. Cooley. June, 1903.
47. Sheep feeding, winter of 1902-1903. By F. B. Linfield. Sept., 1903.
48. Steer feeding, winter of 1902-1903. By F. B. Linfield. Sept., 1903.
49. Contagious abortion in Montana. By H. C. Gardiner. Oct., 1903.
50. Poultry management. By F. B. Linfield.—Poultry diseases. By H. C. Gardiner. Oct., 1903.
51. First annual report of the State entomologist of Montana. By R. A. Cooley. Dec., 1903.
52. Sugar beets, the crop of 1903. By F. W. Traphagen. Apr., 1904.
53. Creameries and cheese factories: Organization, building, and equipment. By W. J. Elliott. Aug., 1904.
54. The alkali soils of Montana, second bulletin. By F. W. Traphagen. Oct., 1904.
55. Second annual report of the State entomologist. By R. A. Cooley. Dec., 1904.
56. Native economic plants of Montana. By J. W. Blankinship. Apr., 1905.
57. Feeding pigs for the years 1903 and 1904. By F. B. Linfield. Sept., 1905.
58. Fattening cattle for the years 1904 and 1905. By F. B. Linfield. Nov., 1905.
59. Sheep feeding for the years 1904 and 1905. By F. B. Linfield. Nov., 1905.
60. Onion growing: A preliminary report. By R. W. Fisher. Dec., 1905.

61. Food adulteration. By F. W. Traphagen. Dec., 1905.
62. Third annual report of the State entomologist. By R. A. Cooley. Dec., 1905.
63. Dry farming in Montana. By F. B. Linfield and Alfred Atkinson. Jan., 1907.
64. Fourth annual report of the State entomologist of Montana. By R. A. Cooley. Dec., 1906.
65. Seepage and drainage, Part I. By E. T. Tannatt and A. P. Anderson. Mar., 1907.
66. An orchard study of the Bitter Root Valley. By R. W. Fisher. Jan., 1907.
67. Practical beekeeping. By Ralph Benton. June, 1907.
68. Canadian field peas. By Alfred Atkinson. Oct., 1907.
69. The effect of alkali on Portland cement. By A. T. Tannatt and Edmund Burke. Feb., 1908.
70. The Douglas spruce cone moth. By R. A. Cooley. Feb., 1908.
71. Fifth annual report of the State entomologist of Montana. By R. A. Cooley. Feb., 1908.
72. Measurement of water. By E. T. Tannatt and R. D. Kneale. Feb., 1908. A revision of 34.
73. Pig feeding experiments. F. B. Linfield. Sept., 1908.
74. Dry farming investigations in Montana. By Alfred Atkinson and J. B. Nelson. Dec., 1908.
75. Sixth annual report of the State entomologist of Montana. By R. A. Cooley. [Dec., 1908].
76. Seepage and drainage, Part II. By E. T. Tannatt and R. D. Kneale. Feb., 1909.
77. Fruit tree planting in Montana. By R. W. Fisher. July, 1909.
78. Steer feeding: Small grains and clover hay for two-year old steers. By R. W. Clark. Jan., 1910.
79. Seventh annual report of the State entomologist of Montana. By R. A. Cooley. Feb., 1910.
80. Ornamental trees and shrubs for Montana. By R. W. Fisher. July, 1910.
81. The destruction of hydraulic cements by the action of alkali salts. By Edmund Burke and R. M. Pinckney. Nov., 1910.
82. Eighth annual report of the State entomologist, 1910. By R. A. Cooley. Dec., 1910.
83. Dry farming investigations in Montana. By Alfred Atkinson and J. B. Nelson. Jan., 1911.
84. Grain investigations with wheat, oats, and barley. By Alfred Atkinson. Jan., 1911.
85. Tick control in relation to the Rocky Mountain spotted fever. By R. A. Cooley. May, 1911.
86. The use of soap to retard the settling of certain arsenicals. By J. R. Parker. July, 1911.
87. Dry farm moisture studies. By Alfred Atkinson, H. O. Buckman, and L. F. Gieseker. Sept., 1911.
88. Ninth annual report of the State entomologist of Montana. By R. A. Cooley. Feb., 1912.
89. Experiments with pigs. By R. W. Clark. June, 1912.
90. The internal use of carbolic acid for the prevention of contagious abortion in cattle with some notes on the relation of granular vaginitis to abortion. By W. J. Taylor. July, 1912.
91. Winter injury to fruit buds of the apple and the pear. By O. B. Whipple. July, 1912.
92. Tenth annual report of the State entomologist of Montana. By R. A. Cooley. Nov., 1912.
93. Fergus County substation: Report on the work and plans. By J. M. Stephens. July, 1913.
94. Clover and corn silage as feeds for dairy cows. By R. W. Clark. July, 1913.
95. Horse-feeding experiments. By R. W. Clark. Aug., 1913.
96. A contribution to our knowledge of apple scab. By H. E. Morris. Feb., 1914.
97. Farm management in the Gallatin Valley. By E. L. Currier. Feb., 1914.
98. Eleventh annual report of the State entomologist of Montana. By R. A. Cooley. Feb., 1914.
99. A report on Montana climate. Temperature records, 1898-1913. By Edmund Burke and R. M. Pinckney. Mar., 1914.
100. Winter wheat. By Alfred Atkinson and J. B. Nelson. Aug., 1914.
101. First annual report of the State Grain Laboratory of Montana. By Alfred Atkinson and B. W. Whitlock. Oct., 1914.
102. Twelfth annual report of the State entomologist of Montana. By R. A. Cooley. Dec., 1914.
103. Irrigation development in Montana. By S. T. Harding. Jan., 1915.
104. Tomato tests. By O. B. Whipple and L. G. Schermerhorn. Feb., 1915.
105. The intradermal test in bovine tuberculosis. By Howard Welch. Feb., 1915.
106. Thinning experiments with potatoes; a preliminary report. By O. B. Whipple. Oct., 1915.
107. Corn in Montana: History, characteristics, adaptation. By Alfred Atkinson and M. L. Wilson. Oct., 1915.
108. Second annual report of the State Grain Laboratory of Montana. By Alfred Atkinson and B. W. Whitlock. Oct., 1915.
109. Thirteenth annual report of the State entomologist of Montana. By R. A. Cooley. Feb., 1916.
110. Dry farm grain tests in Montana. By Alfred Atkinson and N. C. Donaldson. Feb., 1916.
111. Profits in farming on irrigated areas in the Gallatin Valley, Montana. By E. L. Currier. Oct., 1916.
112. Fourteenth annual report of the State entomologist of Montana. By R. A. Cooley.—Notes on the more common mosquitoes of Montana. By J. R. Parker. Dec., 1916.
113. Third annual report of the State Grain Laboratory of Montana. By Alfred Atkinson, B. W. Whitlock, and E. W. Jahnke. Dec., 1916.
114. Report of the work of the horticultural substation. By O. B. Whipple. Dec., 1916.
115. Investigations on irrigation pumping plants. By H. E. Murdock. Jan., 1917.
116. Dry farm crop rotations and cultural methods. By Alfred Atkinson, J. M. Stephens, and G. W. Morgan. Mar., 1917.
117. Studies on the composition and nutritive value of clover hay and clover silage in Montana. By Edmund Burke. Apr., 1917.
118. Sunflower silage for dairy cows, a preliminary report. By C. N. Arnett and Oscar Tretsven. Sept., 1917.
119. Hairlessness and goiter in new-born domestic animals. By Howard Welch. Sept., 1917.
120. Date and rate-of-seeding tests with spring grains under irrigation. By Alfred Atkinson. Oct., 1917.
121. Crown-gall injury in the orchard. By D. B. Swingle and H. E. Morris. Jan., 1918.
122. The cost of growing wheat on typical nonirrigated areas in Montana. By E. L. Currier. Jan., 1918.
123. Plum pocket and leaf gall on American plums. By D. B. Swingle and H. E. Morris. Feb., 1918.
124. Fifteenth annual report of the State entomologist of Montana. By R. A. Cooley. Feb., 1918.
125. Fourth annual report of the Montana Grain Inspection Laboratory. By Alfred Atkinson and E. W. Jahnke. Mar., 1918.
126. Sixteenth annual report of the State entomologist of Montana. By R. A. Cooley. Dec., 1918.
127. Fifth annual report of the Montana Grain Inspection Laboratory. By Alfred Atkinson, E. W. Jahnke, and C. R. Haller. Dec., 1918.
128. Forage crop experiments with swine. By C. N. Arnett and W. E. Joseph. Feb., 1919.
129. Farm practice in growing sugar beets in the Billings region of Montana. By S. B. Nuckolls and E. L. Currier. Mar., 1919.
130. Degeneration in potatoes. By O. B. Whipple. Apr., 1919.
131. Growing and feeding sunflowers in Montana: Growing sunflowers. By Alfred Atkinson and J. B. Nelson.—Feeding sunflowers. By C. M. Arnett, W. E. Joseph, and Oscar Tretsven. Apr., 1919.
132. Corn experiments at the Judith Basin substation. By W. P. Baird. June, 1919.
133. Seventeenth annual report of the State entomologist of Montana. By R. A. Cooley. Dec., 1919.
134. Studies on the digestibility of sunflower silage. By W. E. Joseph and M. J. Blish. Jan., 1920.

135. Sixth annual report of the Montana Grain Inspection Laboratory. By Alfred Atkinson and E. W. Jahnke. Jan., 1920.
136. Seventh annual report of the Montana Grain Inspection Laboratory. Montana grades for grain; Montana State grain inspection law. By P. V. Cardon, W. O. Whitcomb, and W. F. Day. Aug., 1920.
137. The septic tank, a method of sewage disposal for the isolated home. By H. E. Murdock. Sept., 1920.
138. Summer fallowing experiments in the Judith Basin. By W. P. Baird. Oct., 1920.

## NEBRASKA.

## Agricultural Experiment Station of Nebraska, Lincoln.

## BULLETINS.

- [1]. Irrigation in Nebraska. By L. E. Hicks. Jan., 1888.
- [2]. Twenty-two common insects of Nebraska. By C. McMillan. Feb., 1888.
- [3]. Southern cattle plague and yellow fever, from the etiological and prophylactic standpoints. F. S. Billings. Mar., 1888. See 7-10.
- [4]. Swine plague. By F. S. Billings. June, 1888.
5. On certain injurious insects of the year 1888. By Lawrence Bruner. Jan., 1889.
6. Report of progress, including a history of the fields and description of the animals available for experimentation. By H. H. Wing.—Field experiments and observations for the year 1888. By J. G. Smith.—Meteorological record for the year 1888. By D. B. Brace and F. F. Almy. Mar., 1889.
- 7-10. Original investigations of cattle diseases in Nebraska, 1886-1888: Southern cattle plague (Texas fever) and yellow fever; the cornstalk disease in cattle; the so-called hydrophobia in cattle; contagious inflammation of the cornea in cattle; a singular disease of the sexual organs in cows. By J. S. Billings. June, 1889. See 22-23 and 28.
11. The smut of wheat and oats. By J. C. Arthur and C. E. Bessey.—The smut of Indian corn. By C. E. Bessey.—A preliminary enumeration of the rusts and smuts of Nebraska. By H. J. Webber and C. E. Bessey.—Notes on the fungi of economic interest observed in Lancaster County, Nebraska, during the summer of 1889. By Roscoe Pound.—Observations on the cottonwood. By A. F. Woods. Dec., 1889.
12. Field experiments for 1889. By J. G. Smith. Feb., 1890.
13. Experiments in the culture of the sugar beet in Nebraska. By H. H. Nicholson and Rachel Lloyd. Apr., 1890.
14. Insects injurious to young trees on tree claims. By Lawrence Bruner. June, 1890.
15. Meteorological record for the year 1889. By D. B. Brace and F. F. Almy.—Record of soil temperatures for the year 1889; farm notes. By J. G. Smith. Sept., 1890.
16. Experiments in the culture of the sugar beet in Nebraska. By H. H. Nicholson and Rachel Lloyd. Apr., 1891.
17. Field experiments and observations for 1890. By J. G. Smith.—Meteorological observations for 1890. By D. B. Brace and H. N. Allen. June, 1891.
- [18]. A preliminary report on the native trees and shrubs of Nebraska. By C. E. Bessey. [1891?]
19. Farm notes for 1891. By C. L. Ingersoll. [1892?]
20. Meteorological observations for 1891. By D. B. Brace. Mar., 1892.
21. Experiments in the culture of the sugar beet in Nebraska. By H. H. Nicholson and Rachel Lloyd. Mar., 1892.
- 22-23. The corn-fodder disease in cattle and other farm animals, with special relation to contagious pleuropneumonia in American beeves in England. By F. S. Billings. Oct., 1892. A revision of 7-10, Art. II.
24. Notes on certain caterpillars attacking sugar beets. By Lawrence Bruner. Sept., 1892.
25. Detasseling corn. By C. L. Ingersoll. Dec., 1892.
26. Meteorological observations for 1892. By D. B. Brace [and others]. Mar., 1893.
27. Experiments in the culture of the sugar beet in Nebraska. By H. H. Nicholson and T. L. Lyon. Mar., 1893.
- 25 [i. e. 28]. Original investigations in cattle diseases in Nebraska: Southern cattle plague (Texas fever). Third edition. By F. S. Billings. Mar., 1893. Supersedes 3, and 7-10, Art I.
29. Cost of farm crops. By C. L. Ingersoll and S. W. Perin. Apr., 1893.
30. The influences of changes of food and temperature on the quality and quantity of the milk of dairy cows. By C. L. Ingersoll and H. B. Duncanson. Oct., 1893.
31. The Russian thistle in Nebraska. By C. E. Bessey. Dec., 1893.
32. Wheat and some of its products. By C. L. Ingersoll, C. E. Bessey, H. H. Nicholson, and F. S. Johnson. Feb., 1894.
33. Meteorological observations for 1893. By D. B. Brace. Apr., 1894.
34. Chinch bugs. By Lawrence Bruner and H. G. Barber. May, 1894.
35. Alfalfa; farm notes. By C. L. Ingersoll. May, 1894.
36. Experiments in the culture of the sugar beet in Nebraska. By H. H. Nicholson and E. E. Nicholson. May, 1894.
37. Monthly weather review of the Nebraska weather service, 1894. By G. D. Swezey and G. A. Loveland. [In seven parts.] Jan.-Dec., 1894. Name of station and bulletin numbers are printed inconspicuously at foot of title pages of the various parts, part 1 for Jan.-May; parts 2-7, monthly.
38. Nebraska and the beet-sugar industry. By Max Hollrung. Translated by H. H. Nicholson. Aug., 1894. Translated from *Ztschr. Ver. Rübenzuckerind.*, 43 (1893), p. 1005-1034.
39. Some obstacles to successful fruit growing. By F. W. Card. Jan., 1895.
40. A preliminary list of the honey-producing plants of Nebraska. By C. E. Bessey. Jan., 1895.
41. Water supply in Nebraska. By O. V. P. Stout. Feb., 1895.
42. Nebraska weather review for 1895. By G. D. Swezey and G. A. Loveland. [In thirteen parts.] Jan.-Dec., 1895.
43. The conservation of soil moisture by means of subsoil plowing. By T. L. Lyon. Sept., 1895.
44. Experiments in the culture of the sugar beet in Nebraska. By H. H. Nicholson and T. L. Lyon. Apr., 1896.
45. The rainfall of Nebraska. By G. D. Swezey and G. A. Loveland. June, 1896.
46. Nebraska weather and climate for 1896. By G. D. Swezey and G. A. Loveland. Jan.-July, 1896.
47. Serum therapy in hog cholera. By A. T. Peters. Feb., 1897.
48. Windbreaks. By F. W. Card. Apr., 1897.
49. Suggestions for chicory culture. By T. L. Lyon. Apr., 1897.
50. Notes on pruning. By F. W. Card. Nov., 1897.
51. Observations on the codling moth. By F. W. Card. Dec., 1897.

52. Cornstalk disease. By A. T. Peters. Jan., 1898.
53. A preliminary report on experiments with forage crops. By T. L. Lyon. Mar., 1898.
54. The effect of certain methods of soil treatment upon the corn crop. By T. L. Lyon. June, 1898.
55. Ornamental planting. By F. W. Card. Aug., 1898.
56. Methods of tree planting. By F. W. Card. Aug., 1898.
57. Proceedings of agricultural students' association, 1898-99. Apr., 1899.
58. Annual forage plants for summer pasture. By T. L. Lyon and A. L. Haecker. Apr., 1899.
59. The homemade windmills of Nebraska. By E. H. Barbour. 1899.
60. Experiments in the culture of the sugar beet in Nebraska. By H. H. Nicholson and T. L. Lyon. Sept., 1899.
61. Hungarian brome grass (*Bromus inermis*). By T. L. Lyon. Dec., 1899.
62. The feeding value of sorghum as shown by chemical analysis. By R. W. Thatcher. Mar., 1900.
63. The fatal effect of green sorghum. (Preliminary report.) By R. S. Hiltner. Apr., 1900.
64. Proceedings of agricultural students association, 1899-1900. May, 1900.
65. Blackleg; its nature, cause, and prevention. By A. T. Peters. June, 1900.
66. Sheep-feeding experiments in Nebraska. By E. A. Burnett. Aug., 1900.
67. Experiments in the culture of the sugar beet in Nebraska. By H. H. Nicholson and T. L. Lyon. Aug., 1900.
68. Feeding skim milk to calves. By A. L. Haecker. Mar., 1901.
69. Some forage plants for summer feed. By T. L. Lyon and A. L. Haecker. Mar., 1901.
70. Locusts or grasshoppers. By Lawrence Bruner. Mar., 1901.
71. Sheep feeding experiments in Nebraska. (Second experiment.) By E. A. Burnett. Sept., 1901.
72. The adaptation and improvement of winter wheat. By T. L. Lyon. Apr., 1902.
73. Experiments in the culture of the sugar beet in Nebraska. By T. L. Lyon and A. T. Wiancko. May, 1902.
74. Mange in cattle and horses and lice on hogs. By A. T. Peters. May, 1902.
75. Feeding experiments with cattle and pigs. By E. A. Burnett and H. R. Smith. Nov., 1902.
76. Experiments with dairy herd: The herd record; ration tests for dairy cows; the best week in a cow's lactation period. By A. L. Haecker. Jan., 1903.
77. Poisoning of cattle by common sorghum and kafir corn (*Sorghum vulgare*). By A. T. Peters, H. B. Slade, and Samuel Avery. Jan., 1903.
78. Macaroni wheats. By T. L. Lyon. Mar., 1903.
79. Experiments in orchard culture. By R. A. Emerson. July, 1903.
80. Experiments in mulching garden vegetables. By R. A. Emerson. July, 1903.
81. Experiments in the culture of the sugar beet in Nebraska. By T. L. Lyon and A. T. Wiancko. Sept., 1903.
82. Kherson oats. By T. L. Lyon. Mar., 1904.
83. Cooperative variety tests of corn in 1902 and 1903. By T. L. Lyon. Apr., 1904.
84. Pasture, meadow, and forage crops. By T. L. Lyon and A. S. Hitchcock. June, 1904.
85. Feeding experiments with cattle. By E. A. Burnett and H. R. Smith. Oct., 1904.
86. Destroying prairie dogs. By A. T. Peters and Samuel Avery. Oct., 1904.
87. A test of calf rations. By A. L. Haecker.—Methods of controlling contamination of milk during milking. By A. L. Haecker and C. W. Melick. Feb., 1905.
88. Apple scab and cedar rust. By R. A. Emerson. May, 1905.
89. Winter wheat. By T. L. Lyon and A. Keyser. June, 1905.
90. Cattle-feeding experiment. By H. R. Smith. Nov., 1905.
91. Experiments with corn. By T. L. Lyon. Dec., 1905.
92. Cover-crops for young orchards. By R. A. Emerson. June, 1906.
93. Cattle feeding experiments. By H. R. Smith. June, 1906.
94. Fattening pigs on corn and tankage. By E. A. Burnett. Oct., 1906.
95. Crop production in western Nebraska. By W. P. Snyder. (North Platte Substation Bul. 1.) Mar., 1907.
96. Some insects injurious to wheat during 1905-6. By Lawrence Bruner and M. H. Swenk. Mar., 1907.
97. Potato experiments. By R. A. Emerson. Apr., 1907.
98. Spraying demonstrations in Nebraska apple orchards. By R. A. Emerson. Apr., 1907.
99. Growing hogs in western Nebraska. By W. P. Snyder. (North Platte Substation Bul. 2.) June, 1907.
100. Economical rations in beef production. By H. R. Smith. Sept., 1907.
101. Dairy herd record for ten years: cost of butter fat production. By A. L. Haecker. Nov., 1907.
102. The effect of bleaching upon the quality of wheat flour. By F. J. Alway. Oct., 1907.
103. The budrot of carnations. By F. D. Heald.—A mite accompanying the budrot of carnations. By R. H. Wolcott. Jan., 1908.
104. Cultivation of small grains; the use of the fanning mill for selecting seed wheat and seed oats. By E. G. Montgomery. May, 1908.
105. Growing cattle in western Nebraska. By W. P. Snyder. (North Platte Substation Bul. 3.) Mar., 1908.
106. Does it pay to spray Nebraska apple orchards. By R. A. Emerson and F. E. Denny. May, 1908.
107. Foods supplementary to corn in fattening pigs; the effect of food on breaking strength of bones. By E. A. Burnett. Dec., 1908.
108. Milking machines. By A. L. Haecker and E. M. Little. Dec., 1908.
109. Crop production in western Nebraska; principles of cultivation. By W. P. Snyder and W. W. Burr. (North Platte Substation Bul. 4.) Apr., 1909.
110. Report of the Nebraska seed laboratory. By E. M. Wilcox and Nelle Stevenson. June, 1909.
111. Changes in the composition of the loess soils of Nebraska caused by cultivation. By F. J. Alway. Dec., 1909.
112. Experiments with corn. By E. G. Montgomery. Dec. 15, 1909.
113. Oats: Variety tests, rate of sowing, cultivation. By E. G. Montgomery. Feb. 15, 1910.
114. Storing moisture in the soil. By W. W. Burr. (North Platte Substation Bul. 5.) May 3, 1910.
115. The determination of humus. By F. J. Alway, E. K. Files, and R. M. Pinckney. June, 1910.
116. Economical beef production. By H. R. Smith. Dec. 15, 1910.
117. Growing feeder steers in western Nebraska. By W. P. Snyder. (North Platte Substation Bul. 6.) Feb. 1, 1911.
118. Growing crops in western Nebraska. By W. P. Snyder and W. W. Burr. (North Platte Substation Bul. 7.) Feb. 15, 1911.
119. Spraying as an essential part of profitable apple orcharding. By R. A. Emerson, R. F. Howard, and V. V. Westgate. Mar. 15, 1911.
120. Alfalfa management. By C. W. Pugsley. (Extension Bul. 1.) May 12, 1911.
121. Growing hogs in Nebraska: The cost of a 50-pound pig, and the cost of keeping brood sows; the cost of growing pigs on alfalfa pasture and grain. By W. P. Snyder. (North Platte Substation Bul. 8.) June 30, 1911.
122. Cost of growing crops in Nebraska. By C. W. Pugsley. (Extension Bul. 2.) June 30, 1911.

123. Fattening hogs in Nebraska: Alfalfa with corn for fattening hogs; comparisons of corn, corn and alfalfa, and supplementary foods for fattening hogs. By W. P. Snyder. (North Platte Substation Bul. 9.) Feb. 22, 1912.
124. Fattening hogs in Nebraska: Alfalfa hay with corn for fattening hogs; comparisons of corn, corn and alfalfa, with supplementary foods for fattening hogs. By W. P. Snyder. (North Platte Substation Bul. 10.) June 15, 1912.
125. Wheat breeding experiments. By E. G. Montgomery. Mar. 15, 1912.
126. Native seed corn. By E. G. Montgomery. Mar. 20, 1912.
127. Competition in cereals. By E. G. Montgomery. May 6, 1912.
128. Studies in water requirements of corn. By E. G. Montgomery and T. A. Kiesselbach. May 8, 1912.
129. Results of the Douglas County cow testing association. By A. L. Haecker and J. H. Frandsen. May 1, 1912.
130. Forage rations for growing horses. By W. P. Snyder. (North Platte Substation Bul. 11.) June 1, 1912.
131. Smuts of Nebraska cereals. By E. M. Wilcox. (Extension Bul. 7.) Aug. 30, 1912.
132. Beef production: Comparisons of rations; comparisons of breeds and types. By H. R. Smith. Oct. 21, 1912.
133. Care of milk and cream on the farm. By J. H. Frandsen. (Extension Bul. 8.) Oct. 21, 1912.
134. A dry rot of the Irish potato tuber. By E. M. Wilcox and G. K. K. Link. Mar. 25, 1913. A popular edition of Research Bul. 1.
135. Growing crops in western Nebraska. By W. P. Snyder and W. W. Burr. (North Platte Substation Bul. 12.) Apr. 1, 1913.
136. Alfalfa inoculation tests. By C. W. Pugsley. Apr. 10, 1913.
137. Growing forest trees in western Nebraska; shrubs and ornamentals. By W. P. Snyder. (North Platte Substation Bul. 13.) May 26, 1913.
138. Silo construction in Nebraska. By L. W. Chase. June, 1913. Popular edition. May 26, 1913.
139. Dairy herd records for fourteen years. By J. H. Frandsen and A. L. Haecker. Apr. 6, 1914.
140. The storage and use of soil moisture. By W. W. Burr. (North Platte Substation Bul. 14.) Mar. 12, 1914. A popular edition of Research Bul. 5.
141. Irrigated field crops in western Nebraska. By Fritz Knorr. (Scottsbluff Substation Bul. 1.) May 1, 1914.
142. Vegetable gardens on irrigated farms in western Nebraska. By Fritz Knorr. (Scottsbluff Substation Bul. 2.) Apr. 27, 1914.
143. Feeding baby beef: Forage and grain rations for fattening calves under western Nebraska conditions. By W. P. Snyder. (North Platte Substation Bul. 15.) June 22, 1914.
144. Ground wheat versus whole wheat for fattening pigs. By R. K. Bliss and C. B. Lee.—Unpublished data from the North Platte station. By W. P. Snyder. Aug. 15, 1914.
145. Handling silage. By L. W. Chase and I. D. Wood. Sept. 1, 1914.
146. Home mulched vs. northern seed potatoes for eastern Nebraska. By R. A. Emerson. Dec. 24, 1914. Also popular edition. Apr. 15, 1915.
147. Pork production. By W. P. Snyder. (North Platte Substation Bul. 16.) Apr. 10, 1915. Popular edition. May 26, 1915.
148. A handbook of Nebraska grasses, with illustrated keys for their identification, together with a general account of their structure and economic importance. By E. M. Wilcox, G. K. K. Link, and V. W. Pool. Apr. 1, 1915.
149. Raising the dairy calf. By E. G. Woodward. Apr. 5, 1915.
150. Soy beans and cowpeas. By T. A. Kiesselbach. Apr. 6, 1915.
151. Corn silage and alfalfa hay for beef production. By R. K. Bliss and C. B. Lee. May 15, 1915.
152. Management of irrigated land. By Fritz Knorr. (Scottsbluff Substation Bul. 3.) June, 1915.
153. Lamb feeding experiments: Fattening western lambs; fattening native lambs; a comparison of native and western lambs. By H. J. Gramlich. Oct. 25, 1915.
154. The prairie dog and its control. By M. H. Swenk. Aug. 15, 1915.
155. Rotations and tillage methods in western Nebraska. By W. P. Snyder and W. M. Osborn. (North Platte Substation Bul. 17.) June 1, 1916. Popular edition, Sept. 25, 1915.
156. Farming practice in the sand hills section of Nebraska. By James Cowan. (Valentine Substation Bul. 1.) May 25, 1916.
157. Farm management studies in eastern Nebraska. By H. C. Filley. Oct. 15, 1916.
158. Why, when and how to spray. By J. R. Cooper. Feb. 15, 1917. A popular edition of Research Bul. 10.
159. Pork production on irrigated lands in western Nebraska. By J. A. Holden. Apr. 10, 1917.
160. Oats investigations. By T. A. Kiesselbach and J. A. Ratcliff. Nov. 15, 1917.
161. Methods of controlling blister canker. By J. B. Cooper. Dec. 15, 1917. A popular edition of Research Bul. 12.
162. Wintering mature brood sows. By W. P. Snyder. (North Platte Substation Bul. 18.) Dec. 15, 1917.
163. Freezing injury of seed corn. By T. A. Kiesselbach and J. A. Ratcliff. Apr., 1918. A popular edition of Research Bul. 16.
164. Chopped alfalfa versus bran in grain ration for dairy cows. (North Platte Substation Bul. 19.) July, 1918.
165. Growing pigs in summer. By W. P. Snyder. (North Platte Substation Bul. 20.) June 15, 1918.
166. Soy beans. By T. A. Kiesselbach. May 1, 1918.
167. Feeding lambs in the fall. By H. J. Gramlich. July, 1918.
168. Sugar-saving substitutes in ice cream. J. H. Frandsen, J. W. Rovner, and John Luithly. July, 1918.
169. Forage crops. By T. A. Kiesselbach. Dec., 1918.
170. Fall lamb feeding. By H. J. Gramlich. Oct., 1918.
171. Crop production in the northern sand hills. (Valentine Substation Bul. 2.) By James Cowan. May, 1919.
172. Spring grains in western Nebraska: Dates of seeding and comparative yields. By L. L. Zook. Mar., 1919.
173. Supplementary feeds in fattening lambs. By H. J. Gramlich. July, 1919.
174. Beef production. By H. J. Gramlich. Sept., 1919.
175. Experimental hog feeding. H. J. Gramlich and E. L. Jenkins. Sept., 1920.
176. Summer hog feeding. By H. J. Gramlich. Dec., 1920.

## RESEARCH BULLETINS.

1. A dry rot of the Irish potato tuber. By E. M. Wilcox, G. K. K. Link, and V. W. Pool. Mar. 1, 1913. See Bul. 134.
2. The inheritance of quantitative characters in maize. By R. A. Emerson and E. M. East. Apr. 1, 1913.
3. Studies on the relation of the non-available water of the soil to the hygroscopic coefficient. By F. J. Alway. June 25, 1913.

4. The inheritance of a recurring somatic variation in variegated ears of maize. By R. A. Emerson. Feb. 1, 1914.
5. The storage and use of soil moisture. By W. W. Burr. July 1, 1914.
6. Transpiration as a factor in crop production. By T. A. Kiesselbach. June 20, 1916.
7. A genetic study of plant height in *Phaseolus vulgaris*. By R. A. Emerson. Mar. 15, 1916.
8. The colloidal swelling of wheat gluten in relation to milling and baking. By F. W. Upson and J. W. Calvin. June 30, 1916.
9. A physiological study of two strains of Fusarium in their casual relation to tuber rot and wilt of potato. By G. K. Link. Sept. 15, 1916. Reprint June 30, 1917.
10. Spraying experiments in Nebraska. By J. R. Cooper. Apr. 10, 1917.
11. Relation of size of seed and sprout value to the yield of small grain crops. By T. A. Kiesselbach and C. A. Helm. Dec. 1, 1917.
12. Studies of the etiology and control of blister canker on apple trees. By J. R. Cooper. Dec. 15, 1917.
13. Studies concerning the elimination of experimental error in comparative crop tests. By T. A. Kiesselbach. June 15, 1918.
14. Fusarium blight of the soy bean and the relation of various factors to infection. By R. O. Cromwell. Nov., 1919.
15. Farm types in Nebraska, as determined by climatic, soil, and economic factors. By R. R. Spafford. Mar. 15, 1919.
16. Freezing injury of seed corn. By T. A. Kiesselbach and J. A. Ratcliff. June, 1920.
17. The immunizing value of commercial vaccines and bacterins against hemorrhagic septicemia. By Leunis Van Es and H. M. Martin. June, 1920.
18. The value of commercial vaccines and bacterins against fowl cholera. By Leunis Van Es and N. M. Martin. June, 1920.

## NEVADA.

## Nevada Agricultural Experiment Station, Reno.

## BULLETINS.

1. History, organization, and proposed work of the station. By LeR. D. Brown. June, 1888.
2. The investigation of the interdependence of plant life and climatic conditions of Nevada. By W. M. Miller. Sept., 1888.
3. Meteorological report for 1888. By W. M. Miller. Dec., 1888.
4. Meteorological report for January, February, and March, 1889. By W. M. Miller. Mar., 1889.
5. Meteorological report for April, May, and June, 1889. By W. S. Devol. June, 1889.
6. Meteorological report for July, August, and September, 1889. By W. S. Devol. Sept., 1889.
7. Meteorological report for October, November, and December, 1889. By W. S. Devol. Dec., 1889.
8. The codling moth. By F. H. Hillman. Jan., 1890.
9. A serious rose pest (*Lithophane antennata* Walker). By F. H. Hillman. May, 1890.
10. The pear and cherry slug (*Selandria cerasi* Peck). By F. H. Hillman. July, 1890.
11. Plant-lice infesting the apple (*Aphis mali* Fabr.; *A. malifoliae* Fitch; *Schizoneura lanigera* Haus.). By F. H. Hillman. Sept., 1890.
12. Sugar beet culture. By R. H. McDowell. Apr., 1891.
13. Sugar beet experiments. By R. H. McDowell and N. E. Wilson. Oct., 1891. See also 23.
14. Potato experiments. By R. H. McDowell and N. E. Wilson. Dec., 1891.
15. Dodder (*Cuscuta*) parasitic on alfalfa. By R. F. Hillman. Jan., 1892.
16. The creamery industry. By N. E. Wilson. Apr., 1892.
17. The woolly aphid of the apple (*Schizoneura lanigera* Haus.). By F. H. Hillman. July, 1892.
18. Cheese and its manufacture. By N. E. Wilson. Nov., 1892.
19. Sugar beets. By R. H. McDowell and N. E. Wilson. Dec., 1892.
20. Potatoes; tobacco. By R. H. McDowell. Mar., 1893.
21. Nevada weeds, I. By F. H. Hillman. Sept., 1893.
22. Nevada weeds, II. By F. H. Hillman. Dec., 1893.
23. Sugar beets. By N. E. Wilson. Dec., 1893. Reprint in part of 13.
24. Early flora of the Truckee Valley. By F. H. Hillman. Nov., 1894.
25. Irrigation. By R. H. McDowell. Dec., 1894.
26. Feeding stuffs. By N. E. Wilson and Frederick Stadtmuller. Dec., 1894.
27. Grain, thick and thin seeding; potatoes; different dates of planting. By R. H. McDowell. Dec., 1894.
28. An important elm insect. By F. H. Hillman. Nov., 1895.
29. The San José scale. By F. H. Hillman. Dec., 1895.
30. Wheat: Cutting at different dates. By R. H. McDowell. Dec., 1895.
31. Texas cattle fever. By W. M. Miller. Dec., 1895.
32. Sugar beets. By N. E. Wilson. Dec., 1896.
33. Field notes on some Nevada grasses. By F. H. Hillman. Nov.,
34. Drinking water. By N. E. Wilson. Dec., 1896.
35. Hops. By R. H. McDowell. Dec., 1896.
35. [i. e. 36]. Some common injurious insects of western Nevada. By F. H. Hillman. Dec., 1897.
37. Sugar beets: Notes for 1897. By R. H. McDowell and N. E. Wilson. Dec., 1897.
38. Nevada weeds, III. By F. H. Hillman. 1897.
39. Some Nevada soils. By N. E. Wilson. Dec., 1897.
40. Pig feeding. By R. H. McDowell. Dec., 1898.
41. Steer feeding. By R. H. McDowell. Dec., 1898.
42. Nevada butters. By N. E. Wilson. Dec., 1898.
43. Sugar beets: Notes for 1898. By R. H. McDowell and N. E. Wilson. Dec., 1898.
44. Sugar beets, season of 1899, [Pt. I]. By R. H. McDowell and N. E. Wilson. Dec., 1898.
45. Nature studies: I, Twigs of common trees and shrubs. By F. H. Hillman. Dec., 1898.
46. Nature studies: II, Flowers and fruits of common trees and shrubs. By F. H. Hillman. June, 1900.
47. Clover seeds and their impurities. By F. H. Hillman. Aug., 1900.
48. Nature studies: III, Some ways of seed distribution. By F. H. Hillman. June, 1900.
49. The carpenter worm. By S. B. Doten. Sept., 1900.
50. Sugar beets, season of 1899, [Pt. II.] By R. H. McDowell. Dec., 1900.
51. A preliminary report on the summer ranges of western Nevada sheep. By P. B. Kennedy and S. B. Doten. Dec., 1901.
52. Water supply and irrigation in Nevada. By L. H. Taylor. June, 1902.
53. The burning of dead animals. By R. H. McDowell. June, 1902.
54. Report of irrigation investigations, Humboldt River Valley, Nevada. By J. D. Stannard. 1901.
55. Summer ranges of eastern Nevada sheep. By P. B. Kennedy. Nov., 1903.
56. Crickets: The western cricket (*Anabrus simplex*). By S. B. Doten. Jan., 1904.



57. Grasshoppers in alfalfa fields. By S. B. Doten. Jan., 1904.
58. Ground squirrels and other rodent pests in Nevada. By Peter Frandsen. Mar., 1905.
59. An account of some features of the climate of Reno, Nev. By S. B. Doten. June, 1905.
60. The weather of 1905. By S. B. Doten. Apr., 1906.
61. Ornamental and shade trees. By P. B. Kennedy. June, 1906.
62. Native forage plants and their chemical composition. [By N. E. Wilson, S. C. Dinsmore, and P. B. Kennedy]. June, 1906.
63. Annual report of the board of control, the director [J. E. Stubbs] and members of the station staff for the fiscal year ending June 30th, 1907. Dec., 1907.
64. Digestion experiments with native hay. By S. C. Dinsmore and P. B. Kennedy. Sept., 1907.
65. The European elm scale (*Gossyparia spuria* Modeer). By S. B. Doten. Feb., 1908.
66. Annual report of the board of control, the director [J. E. Stubbs], and the members of the station staff for the fiscal year ending June 30, 1908. Dec., 1908.
67. The Mount Rose weather observatory, 1906-7, with notes on the progress of the observatory 1907-8. By J. E. Church. June, 1908.
68. Equine anemia: An account of a recent inquiry into the nature and cause of an obscure and fatal disease among horses in eastern Nevada. By W. B. Mack. Mar., 1909.
69. A report on irrigation laws and litigation in Nevada. By Henry Thurtell and G. H. True. July, 1909.
70. Food and drug inspection. May, 1909.
71. Digestion experiments on the range. By P. B. Kennedy and S. C. Dinsmore. Aug., 1909.
72. Annual report of the board of control, the director [J. E. Stubbs], and the members of the station staff for the fiscal year ending June 30, 1909. Dec., 1909.
73. A neglected field in photo-micrography. By S. B. Doten. Aug., 1910.
74. Annual report of the board of control, the director [J. E. Stubbs], and the members of the station staff for the fiscal year ending June 30, 1910. Dec., 1910.
74. First annual report of the department of food and drugs inspection for the year ending Dec. 31, 1910. By S. C. Dinsmore. Jan., 1911.
75. The sugar beet industry in Nevada. By C. S. Knight. Mar., 1911.
76. The potato eelworm. By S. B. Doten and Peter Frandsen. Mar., 1911, also Italian translation.
77. Fixing standard weights and measures. May, 1911.
78. Concerning the relation of food to reproductive activity and longevity in certain hymenopterous parasites. By S. B. Doten. Sept., 1911.
79. The avoidance and prevention of frost in the fruit belts of Nevada. By J. E. Church, jr. and S. P. Fergusson. Jan., 1912.
80. Food and drug and weight and measures laws of the State of Nevada, with the rules and regulations adopted for the enforcement of the same. Nov., 1913.
81. Water hemlock (*Cicuta*). By C. A. Jacobson. Mar., 1915.
82. The control of contagious epithelioma in chickens by vaccination. By W. B. Mack and Edward Records. June, 1915. See 84.
83. The value of high-level meteorological data in forecasting changes of temperature: A contribution to the meteorology of Mount Rose, Nevada. By S. P. Fergusson. June 24, 1915.
84. Contagious epithelioma in chickens (chicken pox, swelled head): Its control by vaccination, a popular abstract of Bulletin 82, amplified and illustrated. By W. B. Mack and Edward Records. Apr., 1916. A "popular abstract" of 82.
85. The use of bacterins in the control of fowl cholera. By W. B. Mack and Edward Records. Dec., 1916.
86. Forage and root crops. By C. S. Knight. Apr., 1917.
87. Home potato patches. By C. S. Knight. Apr., 1917. See 90.
88. Field crops for late planting. By C. S. Knight. Apr., 1917.
89. Grain production in Nevada. By C. S. Knight. Oct., 1917.
90. Potato culture in Nevada. By C. S. Knight. Feb., 1918. An expansion of 87.
91. Silage crops for Nevada. By C. S. Knight. Feb., 1918.
92. Irrigation of wheat in Nevada. By C. S. Knight. [Feb., 1918.]
93. Irrigation of alfalfa in Nevada. By C. S. Knight. Apr., 1918.
94. One-night camps versus established bed grounds on Nevada sheep ranges. By C. E. Fleming. June, 1918.
95. Range plants poisonous to sheep and cattle in Nevada. By C. E. Fleming.—Spanish translation. By B. F. Schapelle. July, 1918.
96. Irrigation of field crops in Nevada. By C. S. Knight and George Hardman. 1919.
97. Don't feed fox-tail hay to lambing ewes. By C. E. Fleming and N. F. Peterson. Aug., 1919.
98. Arrow grass, a new stock-poisoning plant (*Triglochin maritima*). By C. E. Fleming [and others]. Jan., 1920.
99. The narrow-leaved milkweed (*Asclepias mexicana*) and the broad-leaved or showy milkweed (*Asclepias speciosa*), plants poisonous to live stock in Nevada. By C. E. Fleming [and others]. Dec., 1920.
100. The poison parsnip or water hemlock (*Cicuta occidentalis*), a plant deadly to live stock in Nevada. By C. E. Fleming [and others]. Dec., 1920.

## NEW HAMPSHIRE.

New Hampshire College Agricultural Experiment Station, Durham.

## BULLETINS.

1. Ensilage. By G. H. Whitcher. Apr., 1888.
2. Feeding experiments. [By G. H. Whitcher.] June, 1888.
3. When to cut corn for ensilage. By G. H. Whitcher. July, 1888
4. The science and practice of stock feeding. By G. H. Whitcher. Nov., 1888. See 127.
5. Fertilizers and fertilizing materials. By G. H. Whitcher. Mar., 1889.
6. Experiments with fertilizers. By G. H. Whitcher. Apr., 1889.
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52. Growing muskmelons in the North. By F. W. Rane. Apr., 1898.
53. The farm water supply. By F. W. Morse. May, 1898.
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63. Third potato report. By F. W. Rane. Mar., 1899.
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93. The cold storage of apples: Apples in cold storage. By F. W. Rane.—Influence of cold storage on the decay of apples; effect of wrapping apples in paper. By H. H. Lamson.—Chemical changes in apples during storage. By F. W. Morse. Oct., 1902.
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109. The pernicious or San José scale insect in New Hampshire. By C. M. Weed. Mar., 1904.
110. Experiments in orchard management in New England. By F. W. Rane. Mar., 1904.
111. Ten experiments with potatoes and potato culture for New England. By F. W. Rane and H. F. Hall. Apr., 1904.
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113. Corn meal, middlings, and separator skim milk for fattening pigs. By E. L. Shaw. Oct., 1904.
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167. The fertilizer inspection for 1913 made for the department of agriculture. By B. E. Curry and T. O. Smith. Dec., 1913.
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172. Mendelism in melons. By David Lumsden. June, 1914.
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176. The fertilizer inspection for 1915 made for the State department of agriculture. By B. E. Curry and T. O. Smith. Sept., 1915.
177. Results of seed tests for 1915 made for the State department of agriculture. By F. W. Taylor and F. S. Prince. Sept., 1915.
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189. Analysis of fertilizers for 1918 made for the State department of agriculture. By B. E. Curry and T. O. Smith. Aug., 1918.
190. Sod, tillage, and fertilizers for the apple orchard: A ten-year summary. By J. H. Gourley. Jan. 1919.
191. Inspection of commercial feeding stuffs made for the State department of agriculture. By T. O. Smith. June, 1919.
192. Report of the New Hampshire Agricultural Experiment Station for the fiscal year ending June 30, 1918. By J. G. Kendall. June, 1919.
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1. An annotated catalogue of the butterflies of New Hampshire. By W. F. Fiske. 1901.
2. The classification of American muskmelons. By F. W. Rane. Mar., 1901.
3. The food of the myrtle warbler. By C. M. Weed and Ned Dearborn. Nov., 1901.
4. Effect of acetylene gaslight on plant growth. By F. W. Rane. Oct., 1902.
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7. The relation of temperature to insect life: I, The variation in velocity of development at different constant temperatures. By E. D. Sanderson and L. M. Peairs. Dec., 1913.
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11. Notes on the presence of nitrates in orchard soils. By J. H. Gourley and V. D. Shunk. Oct., 1916.
12. Some observations on the growth of apple trees. By J. H. Gourley. July, 1917.
13. Physiology of the apple: Distribution of food materials in the tree at different periods of vegetation. By O. R. Butler, T. O. Smith, and B. F. Curry. Dec., 1917.
14. Some fundamental factors that determine progress in farm sheep breeding. By E. G. Ritzman. Apr., 1919.
15. A comparison of some traits of conformation of Southdown and Rambouillet sheep and of their F<sub>1</sub> hybrids, with preliminary data and remarks on variability in F<sub>2</sub>. By E. G. Ritzman and C. B. Davenport. Apr., 1920.
16. A respiration chamber for large domestic animals. By F. G. Benedict, W. E. Collins, Mary F. Hendry, and Alice Johnson. Apr., 1920.

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New Jersey Agricultural College Experiment Station, New Brunswick.

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1. Suggestions in regard to the cranberry rot and its cure. May 17, 1880.
2. [Raspberrry disease and suggestions for overcoming it.] By G. H. Cook. [June 4, 1880.]
3. Analyses of land plaster. By G. H. Cook. [June 25, 1880.]
4. [Analyses of guanos, superphosphates, and special manures.] By G. H. Cook. July 3, 1880.
5. Analyses of bone dust. Aug. 9, 1880.
6. [Analyses of fertilizers. Aug. 16, 1880.]
7. [Analyses of fertilizers.] By G. H. Cook. [Aug. 28, 1880.]
8. [Analyses of fertilizers.] By G. H. Cook. Sept. 6, 1880.
9. [Analyses of fertilizers. By G. H. Cook.] Oct. 16, 1880.
10. [Rational system of feeding milch cows.] By G. H. Cook. Jan. 15, 1881.  
Buls. 1-10 were issued originally in the form of newspaper slips. The reprint of 1916 combines them in a single pamphlet, supplying titles and dates lacking in the original issues.
11. Ensilage. By G. H. Cook. Mar. 7, 1881.
12. Valuation of fertilizers. By G. H. Cook. Mar. 30, 1881.
13. Land plaster; ground bone. By G. H. Cook. May, 5 1881.
14. Clover seed midge. By G. H. Cook. May 26, 1881.
15. Commercial fertilizers, their composition and valuations. By G. H. Cook. July 18, 1881.
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18. Sorghum sugar cane. By G. H. Cook. Dec. 20, 1881.
19. Green fodder corn; dried fodder corn; ensilage. By G. H. Cook. Feb. 20, 1882.
20. Valuation of fertilizers. By G. H. Cook. Mar. 30, 1882.
21. Chemical fertilizers, incomplete: Analyses and retail cash prices. By G. H. Cook. July 10, 1882
22. Chemical fertilizers, complete and incomplete. By G. H. Cook. July 28, 1882.
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25. Sorghum and sugar: Experiments and investigations of 1882. By G. H. Cook. Dec. 8, 1882.
26. Field experiments. By G. H. Cook. Jan. 4, 1883.
27. Prices of nitrogen, phosphoric acid, and potash, and analysis of incomplete fertilizers. By G. H. Cook. Apr. 21, 1883.
28. Analyses and valuations of complete manures and special fertilizers. By G. H. Cook. July 2, 1883.
29. Analyses and valuations of nitrogenous superphosphates, ground bones, plain superphosphates, poudrettes, and miscellaneous fertilizers.] By G. H. Cook. Aug. 2, 1883.
30. Results of field and laboratory experiments with sorghum for the season of 1883. By G. H. Cook. Nov. 16, 1883.
31. Nitrate of soda or Chili saltpeter as a top dressing for wheat. By G. H. Cook. Dec. 22, 1883.
32. Prices of nitrogen, phosphoric acid, and potash. By G. H. Cook. Mar. 28, 1884.
33. Analyses and valuations of complete fertilizers. By G. H. Cook. Aug. 2, 1884.
34. [Analyses and valuations of incomplete fertilizers.] By G. H. Cook. Sept. 27, 1884.
35. [Meaning of station's valuations, schedule of trade values for 1885, and chemical composition, retail prices, and guaranteed analyses of fertilizer supplies.] By G. H. Cook. July 1, 1885.
36. Analyses and valuations of complete fertilizers. By G. H. Cook. Oct. 2, 1885.
37. Miscellaneous fertilizers. By G. H. Cook. Dec. 7, 1885.
38. The Rio Grande sorghum sugar works. By G. H. Cook. Dec. 21, 1885.
39. [Meaning of stations' valuations; schedule of trade values for 1886.] By G. H. Cook. Mar. 19, 1886.
40. Analyses and valuations of complete fertilizers. By G. H. Cook. Oct. 16, 1886.
41. The extraction of sugar from sorghum at Rio Grande, Cape May County, New Jersey. Jan. 22, 1887.
42. Analyses and valuations of complete fertilizers. By G. H. Cook. Sept. 3, 1887.
43. Analyses and valuations of complete fertilizers, of ground bone, and of miscellaneous material. By G. H. Cook. Dec. 31, 1887.
44. Sorghum and sugar making: [Introduction]. G. H. Cook.—The sorghum sugar industry, a report upon experiments made at Rio Grande during the season of 1887. By A. T. Neale. Mar. 8, 1888.
45. Prices of nitrogen, phosphoric acid, and potash. By G. H. Cook. Mar. 10, 1888.
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49. Analyses and valuations of complete fertilizers, ground bone, and miscellaneous samples of other fertilizing materials. By G. H. Cook. Nov. 10, 1888.
50. Insects injurious to the cabbage and the best means of preventing their ravages. By G. D. Hulst. Dec. 5, 1888.
51. Sorghum and sugar making: [Introduction]. By G. H. Cook.—The sorghum sugar industry, a report upon experiments made at Rio Grande during the season of 1888. By A. T. Neale. Dec. 31, 1888.
52. What are the worst weeds of New Jersey? By B. D. Halsted. Mar. 20, 1889.
53. Prices of nitrogen, phosphoric acid, and potash. By G. H. Cook. Mar. 26, 1889.
54. Potash as a fertilizer. By E. B. Voorhees. Mar. 27, 1889.
55. Entomological suggestions and inquiries. By J. B. Smith. Mar. 28, 1889.
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67. Note on the wheat louse. By J. B. Smith. May 3, 1890.
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70. Some fungus diseases of the spinach. By B. D. Halsted. July 26, 1890.
71. Analyses of incomplete fertilizers and the value of home mixtures. By E. B. Voorhees. Aug. 14, 1890.
72. Plant lice and how to deal with them. By J. B. Smith. Oct. 4, 1890.

73. Analyses and valuations of complete fertilizers. By E. B. Voorhees. Oct. 6, 1890.
74. Ground bones and miscellaneous samples. By E. B. Voorhees. Oct. 21, 1890.
75. Insecticides and how to apply them; experiment record for 1890. By J. B. Smith. Nov. 7, 1890.
76. Some fungous diseases of the sweet potato. By B. D. Halsted. Nov. 28, 1890.
77. Experiments with different breeds of dairy cows. By James Neilson. Dec. 11, 1890.
78. Destroy the black knot of plum and cherry trees: An appeal. By B. D. Halsted. Jan. 30, 1891.
79. Experiments with nitrate of soda on tomatoes. By E. B. Voorhees. Feb. 28, 1891.
80. Experiments with fertilizers on potatoes and wheat. By E. B. Voorhees. Mar. 14, 1891.
81. Incomplete fertilizers and home mixtures. By E. B. Voorhees. July 1, 1891.
82. The rose chafer or "rosebug" (*Macrodactylis subspinosus*). By J. B. Smith. July 3, 1891.
83. Analyses and valuations of complete fertilizers. By E. B. Voorhees. Sept. 15, 1891.
84. Ground bone and miscellaneous samples. By E. B. Voorhees. Oct. 10, 1891.
85. Farm practice and fertilizers to control insect injury. By J. B. Smith. Dec. 18, 1891.
86. Spraying for insect and fungous pests of the orchard and vineyard. By J. B. Smith and B. D. Halsted. Apr. 4, 1892.
87. Analyses of commercial feeds. By E. B. Voorhees. Apr. 13, 1892.
88. Analyses of home mixtures and incomplete fertilizers. By E. B. Voorhees. July 8, 1892.
89. Analyses and valuations of complete fertilizers and ground bone. By E. B. Voorhees. Oct. 10, 1892.
90. Grasshoppers, locusts, and crickets. By J. B. Smith. Dec. 8, 1892.
91. Some fungous diseases of the quince fruit. By B. D. Halsted. Dec. 14, 1892.
92. Feeding experiments with horses: Dried brewers' grains vs. oats. By E. B. Voorhees and L. A. Voorhees. Feb. 1, 1893.
93. Analyses and study of home-mixed fertilizers and fertilizing materials. By L. A. Voorhees and J. P. Street. July 1, 1893.
94. Insects injurious to cucurbits (melons, squashes, pumpkins, cucumbers, etc.). By J. B. Smith. July 2, 1893.
95. The periodical cicada (*Cicada septendecim* L.). By J. B. Smith. Sept. 11, 1893.
96. Cornstalks and straw as hay substitutes: A bulletin of information. By E. B. Voorhees. Oct. 14, 1893.
97. Analyses and valuations of complete fertilizers, ground bone, and miscellaneous samples. By E. B. Voorhees, L. A. Voorhees, and J. P. Street. Nov. 6, 1893.
98. Club root of cabbage and its allies. By B. D. Halsted. Dec. 9, 1893.
99. The pear midge (*Diplosis pyrivora* Riley). By J. B. Smith. Apr. 4, 1894.
100. Crimson, or scarlet clover (*Trifolium incarnatum*): Its growth, composition, and usefulness. By E. B. Voorhees. June 11, 1894.
101. The use of Koch's lymph in the diagnosis of tuberculosis of cattle. By Julius Nelson. July 2, 1894.
102. Analyses of fertilizing materials and home mixtures; the experience of farmers with home mixtures. By L. A. Voorhees and J. P. Street. July 30, 1894.
103. Some insects injurious to shade trees. By J. B. Smith. Oct. 8, 1894. See 181.
104. Analyses and valuation of complete fertilizers, ground bone, and miscellaneous samples. By E. B. Voorhees, L. A. Voorhees, and J. P. Street. Nov. 19, 1894.
105. Gluten feeds: Their source, composition, and methods of use. By E. B. Voorhees. Nov. 20, 1894.
106. The San José scale in New Jersey. By J. B. Smith. Nov. 22, 1894.
107. Some fungous diseases of beets. By B. D. Halsted. Jan. 10, 1895.
108. Field experiments with fungicides (turnips, cabbage, tomatoes, potatoes, and beans). By B. D. Halsted and J. A. Kelsey. Feb. 20, 1895.
109. Cutworms; the sinuate pear borer; the potato stalk-borer; bisulphide of carbon as an insecticide. By J. B. Smith. Feb. 28, 1895.
110. The Hessian fly (*Cecidomyia destructor* Say). By J. B. Smith. Aug. 8, 1895.
111. "Raupenleim" and "Dendrolene." By J. B. Smith. Sept. 16, 1895.
112. Field experiments with potatoes. By B. D. Halsted. Oct. 22, 1895.
113. Analyses of fertilizer supplies and home mixtures; analyses and valuations of commercial fertilizers and ground bone. By L. A. Voorhees and J. P. Street. Nov. 28, 1895.
114. Suggestions in reference to systematic methods of manuring. By E. B. Voorhees. Nov. 29, 1895.
115. Irrigation of garden crops. By B. D. Halsted and J. A. Kelsey. Nov. 30, 1895.
116. The pernicious or San José scale. By J. B. Smith. Sept. 22, 1896.
117. Analyses of fertilizer supplies and home mixtures; analyses and valuations of commercial fertilizers and ground bone. By L. A. Voorhees and J. P. Street. Nov. 28, 1896.
118. The suppression and prevention of tuberculosis of cattle and its relation to human consumption. By Julius Nelson. Nov. 30, 1896.
119. Apple growing in New Jersey. By [E. B. Voorhees]. Mar. 1, 1897.
120. Field experiments with potatoes for 1896. By B. D. Halsted. Mar. 2, 1897.
121. The harlequin cabbage bug and the melon plant louse. By J. B. Smith. Mar. 10, 1897.
122. The cost and feeding value of the dry matter of dried corn fodder and of silage. By E. B. Voorhees and C. B. Lane. Aug. 16, 1897.
123. Milk: Its value as a food, and studies which suggest a different method of sale. By E. B. Voorhees and C. B. Lane. Sept. 20, 1897.
124. Analyses of fertilizer supplies and home mixtures; analyses and valuations of commercial fertilizers and ground bone. By L. A. Voorhees and J. P. Street. Nov. 26, 1897.
125. The San José scale and how it may be controlled. By J. B. Smith. Nov. 27, 1897.
126. Small fruits. By A. T. Jordan. Nov. 29, 1897.
127. The prevalence, cause, and treatment of bovine abortion, milk fever, and garget. By Julius Nelson. Nov. 30, 1897.
128. The peach borer (*Sanninoidea exitiosa* Say); experiments with hydraulic cement. By J. B. Smith. Feb. 2, 1898.
129. The asparagus rust: Its treatment and natural enemies. By B. D. Halsted. June 10, 1898.
130. Forage crops. By E. B. Voorhees and C. B. Lane. Oct. 10, 1898.
131. Feeds rich in protein; the advantage of a guaranteed composition. By E. B. Voorhees. Oct. 12, 1898.
132. Analyses of fertilizer supplies and home mixtures; analyses and valuations of commercial fertilizers and ground bone. By L. A. Voorhees and J. P. Street. Oct. 18, 1898.
133. Peach growing in New Jersey. By A. T. Jordan. Jan. 17, 1899.
134. Fermentation and germ life. By Julius Nelson. Jan. 23, 1899.
135. The poisonous plants of New Jersey. By B. D. Halsted. Feb. 8, 1899.
136. Field experiments with nitrogenous fertilizers. By E. B. Voorhees. Apr. 17, 1899.
137. Dairy experiments: The yield, composition, and cost of milk; experiments with different rations. By C. B. Lane. Aug. 30, 1899.
138. Crude petroleum as an insecticide. By J. B. Smith. Sept. 5, 1899.
139. Analyses of fertilizer supplies and home mixtures; analyses and valuations of commercial fertilizers and ground bone. By L. A. Voorhees and J. P. Street. Sept. 25, 1899.
140. Three common orchard scales. By J. B. Smith. Oct. 31, 1899.

141. Forcing tomatoes. By A. T. Jordan. Dec. 31, 1899.
142. Pear growing in New Jersey. By A. T. Jordan. Jan. 20, 1900.
143. The apple plant louse (*Aphis mali* Koch). By J. B. Smith. Mar. 8, 1900.
144. Live covers for country homes. By B. D. Halsted. June 30, 1900.
145. Analyses of fertilizer supplies and home mixtures; analyses and valuations of commercial fertilizers and ground bone. By L. A. Voorhees and J. P. Street. Oct. 1, 1900.
146. Crude petroleum versus the San José or pernicious scale. By J. B. Smith. Nov. 1, 1900.
147. The angoumois grain moth (*Sitotroga cerealella* Oliv.). By J. B. Smith. Dec. 10, 1900.
148. Alfalfa: Methods of culture and yields per acre; alfalfa protein versus purchased protein in rations for dairy cows. By E. B. Voorhees and C. B. Lane. Feb. 26, 1901.
149. Two strawberry pests. By J. B. Smith. Feb. 27, 1901.
150. Losses in farm manures; the relative usefulness of the nitrogen in fresh and leached manures; the comparative value of the nitrogen in commercial forms and in natural manures. By E. B. Voorhees. June 4, 1901.
151. Bean diseases and their remedies. By B. D. Halsted. June 1, 1901.
152. Domestic pasteurizing methods and the care of milk in the home. By Julius Nelson. June 7, 1901.
153. Concentrated feeding stuffs. By L. A. Voorhees and J. P. Street. Aug. 30, 1901.
154. Analyses of fertilizer supplies and home mixtures; analyses and valuations of commercial fertilizers and ground bone. By L. A. Voorhees and J. P. Street. Oct. 30, 1901.
155. The entomologist's experiment orchard. By J. B. Smith. Jan. 13, 1902.
156. Cattle food substitutes: A warning to feeders. By L. A. Voorhees and J. P. Street. Feb. 14, 1902.
157. Field experiments with nitrate of soda on market garden crops. By E. B. Voorhees. May 12, 1902.
158. Soiling crop experiments. By C. B. Lane. June 11, 1902.
159. The rose scale (*Diaspis rosae* Bouché). By J. B. Smith. June 13, 1902.
160. Concentrated feeding stuffs. By L. A. Voorhees and J. P. Street. June 25, 1902.
161. Alfalfa, cowpeas, and crimson clover as substitutes for purchased feeds; home-grown protein versus purchased protein. By C. B. Lane. Aug. 30, 1902.
162. Lime, salt, and sulphur wash. By J. B. Smith. Oct. 23, 1902.
163. Analyses of fertilizer supplies, home mixtures, and special compounds; analyses and valuations of commercial fertilizers and ground bone. By L. A. Voorhees and J. P. Street. Oct. 29, 1902.
164. Field experiments with nitrate of soda on forage crops and on market garden crops. By E. B. Voorhees. June 1, 1903.
165. Concentrated feeding stuffs. By L. A. Voorhees and J. P. Street. June 15, 1903.
166. The proper disposal of sewerage wastes in rural districts. By Julius Nelson. June 27, 1903.
167. Some of the newer fungicides. By B. D. Halsted and J. A. Kelsey. June 29, 1903.
168. Analyses of fertilizer supplies, home mixtures, and special compounds; analyses and valuations of commercial fertilizers and ground bone. By J. P. Street, W. P. Allen, and V. J. Carberry. Oct. 1, 1903.
169. Insecticides and their use. By J. B. Smith. Dec. 1, 1903.
170. Experiments in crossing sweet corn: A new variety, the Voorhees Red. By B. D. Halsted and J. A. Kelsey. Feb. 5, 1904.
171. The common mosquitoes of New Jersey. By J. B. Smith. Feb. 8, 1904.
172. The use of fertilizers; a review of the results of experiments with nitrate of soda. By E. B. Voorhees. Feb. 10, 1904.
173. Experiments with manures and fertilizers on different varieties of asparagus and raspberries. By A. T. Jordan. Feb. 15, 1904.
174. Alfalfa hay, cowpea hay, and soy bean silage as substitutes for purchased feeds; cottonseed meal versus wheat bran and dried brewers' grains. By C. B. Lane. Feb. 20, 1904.
175. Concentrated feeding stuffs. By J. P. Street, W. P. Allen, and V. J. Carberry. June 1, 1904.
176. Analyses and valuations of commercial fertilizers. By J. P. Street, W. P. Allen, and V. J. Carberry. Sept. 10, 1904.
177. Analyses of fertilizer supplies, home mixtures, and special compounds; analyses and valuations of commercial fertilizers and ground bone. By J. P. Street, W. P. Allen, and V. J. Carberry. Nov. 15, 1904.
178. Insecticide experiments for 1904. By J. B. Smith. Nov. 28, 1904.
179. Free distribution of experiment station seeds. By B. D. Halsted. Dec. 20, 1904.
180. Experiments on the accumulation and utilization of atmospheric nitrogen in the soil. By E. B. Voorhees and J. G. Lipman. Mar. 1, 1905.
181. Insects injurious to shade trees and ornamental plants. By J. B. Smith. Mar. 2, 1905, supersedes 103.
182. A popular review of the work of the experiment station. By E. B. Voorhees. Mar. 3, 1905.
183. The analyses of stone lime, prepared lime, oyster-shell lime, wood ashes, and marl. By L. A. Voorhees. Mar. 4, 1905.
184. Condimental feeds and condition powders. By J. P. Street. Mar. 28, 1905.
185. Concentrated feeding stuffs. By J. P. Street, W. P. Allen, and V. J. Carberry. May 1, 1905.
186. Late fall spraying for the San José or pernicious scale. By J. B. Smith. Sept. 1, 1905.
187. Analyses and valuations of commercial fertilizers and ground bone. By J. P. Street, W. P. Allen, and V. J. Carberry. Sept. 2, 1905.
188. Analyses of fertilizer supplies, home mixtures, and special compounds; analyses and valuations of commercial fertilizers. By J. P. Street, W. P. Allen, and V. J. Carberry. Nov. 29, 1905.
189. Dried beet pulp as a substitute for corn silage; dried beet pulp versus dried molasses beet pulp; dried molasses beet pulp versus hominy meal. By G. A. Billings. Dec. 6, 1905.
190. Alfalfa: Alfalfa as a forage crop; methods of culture in New Jersey; alfalfa hay versus purchased feeds. By G. A. Billings. Dec. 20, 1905.
191. Seed distribution of 1904 and for 1905. By B. D. Halsted. Dec. 30, 1905.
192. Breeding sweet corn: cooperative tests. By B. D. Halsted. Mar. 2, 1906.
193. Concentrated feeding stuffs. By J. P. Street, W. P. Allen, V. J. Carberry. Mar. 14, 1906.
194. Spraying. By G. F. Warren. Mar. 20, 1906.
195. Analyses of Paris green. By J. P. Street. Sept. 1, 1906.
196. Analyses and valuations of commercial fertilizers; analyses of fertilizer supplies, home mixtures, and special compounds. By J. P. Street, W. P. Allen, and V. J. Carberry. Sept. 12, 1906.
197. Suggestions on the renewal of the peach industry in New Jersey. By G. F. Warren. Sept. 18, 1906.
198. Analyses and valuations of commercial fertilizers and ground bone. By J. P. Street, V. J. Carberry, and P. E. Brown. Dec. 31, 1906.
199. Station novelties in truck crops; further distribution of seeds. By B. D. Halsted. Jan. 11, 1907.
200. The cabbage and onion maggots. By J. B. Smith and E. L. Dickerson. Feb. 12, 1907.
201. Concentrated feeding stuffs. By J. P. Street, J. W. Kellogg, and V. J. Carberry. Apr. 15, 1907.
202. Forest trees of New Jersey. By B. D. Halsted. Apr. 25, 1907.
203. Some household pests. By J. B. Smith. June 3, 1907.
204. Home-grown protein versus purchased protein; distillers' grains versus gluten feed; summer silage versus soiling. By G. A. Billings. June 10, 1907.

205. Analyses of Paris green. By C. S. Cathcart. July 31, 1907.
206. Analyses and valuations of commercial fertilizers; analyses of fertilizer supplies, home mixtures and special compounds. By C. S. Cathcart, J. W. Kellogg, and V. J. Carberry. Sept. 20, 1907.
207. The New Jersey salt marsh and its improvement. By J. B. Smith. Nov. 14, 1907.
208. Analyses and valuations of commercial fertilizers and ground bone. By C. S. Cathcart, V. J. Carberry, and John Gaub. Dec. 12, 1907.
209. Novelties in vegetable fruits, general trial for 1908. By B. D. Halsted. Dec. 14, 1907.
210. Some chemical and bacteriological effects of liming. By E. B. Voorhees, J. G. Lipman, and P. E. Brown. Dec. 16, 1907.
211. Sandy soils and their improvement in the growing of forage crops. By E. B. Voorhees and J. G. Lipman. Jan. 30, 1908.
212. Concentrated feeding stuffs. By C. S. Cathcart, V. J. Carberry, and John Gaub. Apr. 8, 1908.
213. Insecticide materials and their application with suggestions for practice. By J. B. Smith. Sept. 8, 1908.
214. Analyses of Paris green and lead arsenate. By C. S. Cathcart. Sept. 21, 1908.
215. Analyses and valuations of commercial fertilizers; analyses of fertilizer supplies, home mixtures and special compounds. By C. S. Cathcart [and others]. Sept. 24, 1908.
216. The house mosquito, a city, town, and village problem. By J. B. Smith. Nov. 24, 1908.
217. Analyses and valuations of commercial fertilizers and ground bone. By C. S. Cathcart [and others]. Dec. 10, 1908.
218. Vegetable-fruit seed distribution for 1909. By B. D. Halsted. Dec. 19, 1908.
219. The first season with the peach orchard. By M. A. Blake. Feb. 1, 1909.
220. Concentrated feeding stuffs. By C. S. Cathcart, V. J. Carberry, and C. L. Pfersch. Apr. 26, 1909.
221. Investigations relative to the use of nitrogenous materials, 1898-1907. By E. B. Voorhees and J. G. Lipman. July, 1909.
222. Analyses of Paris green and lead arsenate. By C. S. Cathcart. Sept. 14, 1909.
223. Analyses and valuations of commercial fertilizers; analyses of fertilizer supplies, home mixtures, and special compounds. C. S. Cathcart [and others]. Sept. 30, 1909.
224. Analyses and valuations of commercial fertilizers and ground bone. By C. S. Cathcart [and others].—The cost of available nitrogen. By E. B. Voorhees. Dec. 13, 1909.
225. Insects injurious to strawberries. By J. B. Smith. Dec. 15, 1909.
226. Peach yellows and little peach. By M. A. Blake. Jan. 11, 1910.
227. Tests of commercial cultures for soil inoculation. By J. G. Lipman. Jan. 28, 1910.
228. Structure of tomato skins. By B. H. A. Groth. Feb. 3, 1910.
229. Insects injurious to sweet potatoes in New Jersey. By J. B. Smith. Feb. 4, 1910.
230. Concentrated feeding stuffs. By C. S. Cathcart [and others]. Apr. 21, 1910.
231. The second season with the peach orchard. By M. A. Blake. July 22, 1910.
232. Contribution to the study of Bordeaux injury on peaches. By B. H. A. Groth. Sept. 8, 1910.
233. Analyses and valuation of commercial fertilizers; analyses of fertilizer supplies, home mixtures, and special compounds. By C. S. Cathcart [and others]. Oct. 10, 1910.
234. Analyses and valuations of commercial fertilizers and ground bone. By C. S. Cathcart. Nov. 28, 1910.
235. Insects injurious to the peach trees in New Jersey. By J. B. Smith. Feb. 28, 1911.
236. Spraying experiments with peaches. By M. A. Blake and A. J. Farley. Apr. 6, 1911.
237. Concentrated feeding stuffs. By C. S. Cathcart [and others]. Apr. 7, 1911.
238. The  $F_1$  heredity of size, shape, and number in tomato leaves: Pt. I, Seedlings. By B. H. A. Groth. May 11, 1911.
239. The  $F_1$  heredity of size, shape, and number in tomato leaves: Pt. II, Mature plants. By B. H. A. Groth. May 24, 1911.
240. Analyses and valuations of commercial fertilizers; analyses of fertilizer supplies, home mixtures, and special compounds. By G. S. Cathcart [and others]. Sept. 26, 1911.
241. Analyses and valuations of commercial fertilizers and ground bone. By C. S. Cathcart [and others]. Dec. 2, 1911.
242. The  $F_1$  heredity of size, shape, and number in tomato fruits. By B. H. A. Groth. Mar. 30, 1912.
243. Concentrated feeding stuffs. By C. S. Cathcart [and others]. Apr. 10, 1912.
244. Essentials in profitable egg production. By H. R. Lewis. May 9, 1912.
245. The elongation of the hypocotyl: A preliminary study. By B. D. Halsted. May 25, 1912.
246. The availability of nitrogenous materials as measured by ammonification. By J. G. Lipman, A. W. Blair, I. L. Owen, and H. C. McLean. June 1, 1912.
247. Experiments on ammonia formation in the presence of carbohydrates and of other non-nitrogenous organic matter. By J. G. Lipman, A. W. Blair, I. L. Owen, and H. C. McLean. June 1, 1912.
248. Experiments relating to the possible influence of protozoa on ammonification in the soil. By J. G. Lipman, A. W. Blair, I. L. Owen, and H. C. McLean. June 1, 1912.
249. Conditions affecting the availability of nitrogen compounds in vegetation experiments, [I]. By J. G. Lipman, A. W. Blair, I. L. Owen, and H. C. McLean. June 1, 1912.
250. Miscellaneous vegetation experiments. By J. G. Lipman, A. W. Blair, I. L. Owen, and H. C. McLean. June 1, 1912.
251. Factors relating to the availability of nitrogenous plant foods. By J. G. Lipman, A. W. Blair, I. L. Owen, and H. C. McLean. July 1, 1912.
252. Analyses and valuations of commercial fertilizers; analyses of fertilizer supplies, home mixtures, and special compounds. By C. S. Cathcart [and others]. Sept. 21, 1912.
253. The associative growth of legumes and non-legumes. By J. G. Lipman. Oct. 1, 1912.
254. Analyses and valuations of commercial fertilizers and ground bone. By C. S. Cathcart [and others]. Nov. 30, 1912.
255. Fertilizer registrations. By C. S. Cathcart. Jan. 28, 1913.
256. Concentrated feeding stuffs; feeding stuffs law of 1912 and registrations. By C. S. Cathcart [and others]. May 7, 1913.
257. Conditions affecting the availability of nitrogen compounds in vegetation experiments, II. By J. G. Lipman, A. W. Blair, I. L. Owen, and H. C. McLean. Nov. 30, 1912.
258. Experiments on the accumulation and utilization of atmospheric nitrogen in field soils. By J. G. Lipman, A. W. Blair, I. L. Owen, and H. C. McLean. Nov. 30, 1912.
259. Analyses and valuations of commercial fertilizers, fertilizer supplies and home mixtures. By C. S. Cathcart. Sept. 18, 1913.
260. Field experiments on the availability of nitrogenous fertilizers. By J. G. Lipman and A. W. Blair. June 29, 1913.
261. Analyses and valuations of commercial fertilizers and ground bone. By C. S. Cathcart. Dec., 1913.
262. Analyses of materials sold as insecticides and fungicides. By C. S. Cathcart, R. L. Willis, and W. H. Pearson. Dec., 1913.
263. Report of the director, 1912-13. By J. G. Lipman. Dec. 31, 1913.
264. Fertilizer registration. By C. S. Cathcart. Jan. 14, 1914.



265. The ash and protein factor in poultry feeding. By H. R. Lewis. Dec. 31, 1913.
266. Results of seed inspection, 1913. By J. P. Helyar. Mar. 28, 1914.
267. Comparison of magnesian and non-magnesian limestone in rotation experiments. By J. G. Lipman [and others]. Mar. 31, 1914.
268. Nitrogen utilization in field and cylinder experiments. By J. G. Lipman, A. W. Blair, H. C. McLean, and L. F. Merrill. Apr. 15, 1914.
269. Methods and results in vegetation experiments. By J. G. Lipman and A. W. Blair. May 29, 1914.
270. Ammonification studies with soil fungi. By H. C. McLean and G. W. Wilson. June 1, 1914.
271. Concentrated feeding stuffs and registrations for 1914. By C. S. Cathcart. June 1, 1914.
272. Analyses and valuations of commercial fertilizers, fertilizer supplies and home mixtures. By C. S. Cathcart. Sept. 15, 1914.
273. Analyses of materials sold as insecticides and fungicides. By C. S. Cathcart and R. L. Willis. Oct. 26, 1914.
274. Analyses and valuations of commercial fertilizers and ground bone; analyses of agricultural lime. C. S. Cathcart. Dec. 17, 1914.
275. Fertilizer registrations. By C. S. Cathcart. Jan. 7, 1915.
276. The mosquitoes of New Jersey and their control. By T. J. Headlee. Jan. 30, 1915. See 348.
277. Humidity, soil, and fertility studies with roses. By M. A. Blake. Jan. 30, 1915.
278. Some results in size inheritance [in tomatoes]. By B. H. A. Groth. Apr. 14, 1915.
279. Results of seed inspection, 1914. By J. P. Helyar and Robert Schmidt. May 20, 1915.
280. Pot experiments on the availability of nitrogen in mineral and organic compounds. By J. G. Lipman, H. C. McLean, A. W. Blair, and L. K. Wilkins. Dec. 1, 1914.
281. Nitrogen utilization in field and cylinder experiments. By J. G. Lipman, H. C. McLean, A. W. Blair, and L. K. Wilkins. Dec. 1, 1914.
282. Factors influencing the protein content of soy beans. By J. G. Lipman, H. C. McLean, A. W. Blair, and L. K. Wilkins. Dec. 1, 1914.
283. Concentrated feeding stuffs and registrations for 1915. By C. S. Cathcart. June 16, 1915.
284. Packing and shipping peaches in Georgia carriers. By M. A. Blake and C. H. Connors. June 30, 1915.
285. Analyses and valuations of commercial fertilizers, fertilizer supplies and home mixtures. By C. S. Cathcart. Aug. 31, 1915.
286. Analyses of materials sold as insecticides and fungicides. By C. S. Cathcart and R. L. Willis. Sept. 29, 1915.
287. Analyses and valuations of commercial fertilizers and ground bone; analyses of agricultural lime. By C. S. Cathcart. Dec. 9, 1915.
288. Investigations relative to the use of nitrogenous plant-foods, 1898-1912. By J. G. Lipman and A. W. Blair. Jan. 4, 1916.
289. Cylinder experiments relative to the utilization and accumulation of nitrogen. By J. G. Lipman and A. W. Blair. Jan. 4, 1916.
290. Fertilizer registrations for 1916. By C. S. Cathcart. Jan. 18, 1916.
291. The influence of the tannin content of the host plant *Endothia parasitica* and related species. By M. T. Cook and G. W. Wilson. Feb. 1, 1916.
292. The response of the house fly (*Musca domestica* L.) to ammonia and other substances. By C. H. Richardson. Feb. 1, 1916.
293. Effect of pruning peach trees at different heights previous to planting in the orchard. By M. A. Blake. Feb. 1, 1916.
294. Farm profits and factors influencing farm profits on 370 potato farms in Monmouth County, N. J. By Frank App. Apr. 20, 1916.
295. Commercial feeding stuffs and registrations for 1916. By C. S. Cathcart. May 27, 1916.
296. The more important greenhouse insects. By H. B. Weiss. May 31, 1916.
297. Analyses of commercial fertilizers, fertilizer supplies, and home mixtures. By C. S. Cathcart. Sept. 16, 1916.
298. Report of the director for 1916. By J. G. Lipman. Nov. 1, 1916.
299. The influence of salinity on the development of certain species of mosquito larvae and its bearing on the problem of the distribution of species. By F. E. Chidester. [1916?]
300. A biological study of the more important of the fish enemies of the salt marsh mosquitoes. By F. E. Chidester. June 1, 1916.
301. Analyses of materials sold as insecticides and fungicides for 1916. By C. S. Cathcart and R. L. Willis. Oct. 2, 1916.
302. Results of seed inspection, 1915-16. By J. P. Helyar. Nov. 1, 1916.
303. Analyses of commercial fertilizers and ground bone; analyses of agricultural lime. By C. S. Cathcart. Dec. 12, 1916.
304. Fertilizer registrations for 1917. By C. S. Cathcart. Jan. 22, 1917.
305. Maintaining the nitrogen supply of the soil: Continuous wheat and rye with and without a leguminous green manure crop. By A. W. Blair. Jan. 6, 1917.
306. Some recent advances in knowledge of the natural history and the control of mosquitoes. By T. J. Headlee. Oct. 17, 1916.
307. The domestic flies of New Jersey. By C. H. Richardson. Feb. 7, 1917.
308. The Cattleya fly [*Isosoma orchirearum* Westwood]. By J. B. Moore. Oct. 2, 1916.
309. The chemical composition of the soils of the Freehold area in New Jersey. By A. W. Blair and H. C. McLean. Sept. 12, 1916.
310. The high calcium content of some cucurbit vines. By L. K. Wilkins. Apr. 16, 1917.
311. Commercial feeding stuffs and registrations for 1917. By C. S. Cathcart. June 1, 1917.
312. Farm profits and factors influencing farm profits on 284 general and 75 dairy farms in Monmouth County, N. J. By Frank App. Jan. 15, 1917.
313. The parasitic fungi of New Jersey. By C. A. Schwarze. Sept., 1917.
314. Analyses of commercial fertilizers, fertilizer supplies and home mixtures. By C. S. Cathcart. Sept. 19, 1917.
315. Analyses of materials sold as insecticides and fungicides for 1917. By C. S. Cathcart and R. L. Willis. Sept. 27, 1917.
316. Influence of lime upon the yield of dry matter and nitrogen content of alfalfa. By J. G. Lipman and A. W. Blair. Jan. 1, 1917.
317. Report of the director for 1917. By J. G. Lipman. Nov. 1, 1917.
318. Analyses of commercial fertilizers and ground bone; analyses of agricultural lime. By C. S. Cathcart. Dec. 10, 1917.
319. A study of physiological balance for buckwheat grown in three-salt solutions. By J. W. Shive. July, 1917.
320. Farm profits and factors influencing farm profits on 460 dairy farms in Sussex County, N. J. By Frank App. July 1, 1917.
321. Fertilizer registrations for 1918. By C. S. Cathcart. Jan. 28, 1918.
322. Results of seed inspection, 1917. By J. P. Helyar. Feb. 1, 1918.

323. The value of nitrate of soda in crop production. By J. G. Lipman and A. W. Blair. Feb. 9, 1918. Summaries results of all N. J. station experiments on this subject.
324. The strawberry weevil (*Anthrenus signatus* Say). By T. J. Headlee. Jan. 1, 1918.
325. Poultry buildings: Laying and breeding houses. By H. R. Lewis and W. C. Thompson. Mar. 30, 1917.
326. Pruning experiments with peaches: Results of first two seasons. By M. A. Blake and C. H. Connors. May 23, 1917.
327. Commercial feeding stuffs and registrations for 1918. By C. S. Cathcart. May 1, 1918.
328. Some important orchard plantlice. By T. J. Headlee. Feb. 15, 1918.
329. Profits and factors influencing profits on 150 poultry farms in New Jersey. By Frank App, A. G. Waller and H. R. Lewis. Mar. 15, 1918.
330. Report of the director for 1918. By J. G. Lipman. Aug. 15, 1918.
331. Analyses of commercial fertilizers, fertilizer supplies and home mixtures. By C. S. Cathcart. Oct. 10, 1918.
332. Some studies on the eggs of important apple plantlice. By Alvah Peterson. [1918?]
333. Analyses of materials sold as insecticides and fungicides during 1918. By C. S. Cathcart and R. L. Willis. Oct. 26, 1918.
334. Analyses of commercial fertilizers and ground bone; analyses of agricultural lime. By C. S. Cathcart. Dec. 23, 1918.
335. Fertilizer registrations for 1919. By C. S. Cathcart. Jan. 30, 1919.
336. Commercial feeding stuffs and registrations for 1919. Apr. 28, 1919.
337. Analyses of commercial fertilizers, fertilizer supplies and home mixtures. By C. S. Cathcart. Oct. 8, 1919.
338. The first two years of the Vineland contest: A study of the results obtained during the first two years at the Vineland international egg-laying and breeding contest. By H. R. Lewis, R. R. Hannas, and E. H. Wene. Oct., 1919.
339. Analyses of materials sold as insecticides and fungicides during 1919. By C. S. Cathcart and R. L. Willis. Oct. 13, 1919.
340. Analyses of commercial fertilizers and ground bone; analyses of agricultural lime. By C. S. Cathcart. Dec. 30, 1919.
341. Fertilizer registrations for 1920. By C. S. Cathcart. Jan. 26, 1920.
342. Analyses of commercial feeding stuffs and registrations for 1920. By C. S. Cathcart. May 3, 1920.
343. Analyses of materials sold as insecticides and fungicides during 1920. By C. S. Cathcart and R. L. Willis. Oct., 1920.
344. Analyses of commercial fertilizers, fertilizer supplies and home mixtures, 1920. By C. S. Cathcart. Oct. 20, 1920.
345. Studies on tomato leaf-spot control. By W. H. Martin. Oct. 1, 1919.

## SPECIAL BULLETINS.

- A. Yellow tobacco: A superior variety of tobacco which grows well on pine lands. By Henry Garnier and G. H. Cook. Mar. 20, 1882.
- B. Alfalfa or Incerne (*Medicago sativa*). By G. H. Cook. Apr. 15, 1887.
- C. Pollen versus rain: Proposed experiments illustrating the influences of rainfall at blooming time upon subsequent fruitfulness. By B. D. Halsted. Apr. 8, 1889.
- D. Memoranda about cranberry insects. By J. B. Smith. Apr. 9, 1889.
- E. Oyster interests of New Jersey. By Julius Nelson. Apr. 13, 1889.
- F. The horn fly. By J. B. Smith. July 26, 1889.
- G. The potato rot. By B. D. Halsted. Aug. 7, 1889.
- H. The cranberry scald. By B. D. Halsted. Aug. 23, 1889.
- I. Questions relative to general farm practice. By E. B. Voorhees. Oct. 28, 1889.
- J. The sweet potato rot. By B. D. Halsted. Nov. 30, 1889.
- K. The insects injuriously affecting cranberries. By J. B. Smith. Feb. 28, 1890.
- L. Observations upon the peach for 1890. By B. D. Halsted. Apr. 22, 1890.
- M. Field experiments with soil and black rots of sweet potatoes. By B. D. Halsted. Nov. 23, 1891.
- N. Insects injuriously to the blackberry. By J. B. Smith. Nov. 30, 1891.
- O. Experiments with nitrate of soda upon tomatoes. By E. B. Voorhees. Apr. 6, 1892.
- P. Experiments with fertilizers upon white and sweet potatoes. By E. B. Voorhees. Apr. 9, 1892.
- Q. Some fungous diseases of the celery. By B. D. Halsted. Apr. 21, 1892.
- R. Catalogue of reports and bulletins; index of reports, 1880-1897. Dec. 31, 1897.
- S. Soil fungicides for potato and turnip diseases. By B. D. Halsted. Feb., 1900.
- T. The salt-marsh mosquito, *Culex sollicitans* Wlk. By J. B. Smith. July, 1902.

## MISCELLANEOUS.

Report of the New Jersey State Agricultural Experiment Station upon the mosquitoes occurring within the State, their habits, life history, &c. By J. B. Smith. 1904.

## NEW MEXICO.

## Agricultural Experiment Station of New Mexico, State College.

## BULLETINS.

- Announcements. By Hiram Hadley. Apr., 1890.
- Announcements. By A. E. Blount and Hiram Hadley. Oct., 1890.
- A preliminary account of some insects injuriously to fruits. By C. H. T. Townsend. June, 1891.
- Horticultural division: Fruit trees; forest and shade trees; nut-bearing trees; vegetables. By A. E. Blount. Dec., 1891.
- Notices of importance concerning fruit insects: Vine leaf-hopper; codling moth; root borers; green June-beetle. By C. H. T. Townsend. Mar., 1892.
- Agricultural division: Cereals, forage plants, grasses, clovers, textile plants, and sorghums. By A. E. Blount. Mar., 1892.
- Scale insects in New Mexico. By C. H. T. Townsend. June, 1892.
- Wheat, oats, barley, rye, sugar, beets, sorghum, and cañaigne: Varieties tested; manner of planting, irrigating, and cultivating; results obtained. By A. E. Blount. Nov., 1892.
- Insecticides and their appliances. By C. H. T. Townsend. Dec., 1892.
- Insects of 1893. By T. D. A. Cockerell. Sept., 1893.
- Notes on cañaigne. By A. E. Blount.—Meteorological data and deductions. By H. H. Griffin. Oct., 1893.

12. The value of Rio Grande water for the purpose of irrigation. By Arthur Goss. Nov., 1893.
13. New Mexico weeds, I. By E. O. Wooton. Oct., 1894.
14. Cañalgre. By A. E. Blount. Dec., 1894.
15. Entomological observations in 1894; life zones in New Mexico; entomological diary at Santa Fe. By T. D. A. Cockerell. Jan., 1895.
16. Russian thistle. By E. O. Wooton. Sept., 1895.
17. Principles of stock feeding and some New Mexico feeding stuffs. By Arthur Goss. Dec., 1895.
18. Some New Mexico forage plants. By E. O. Wooton. Mar., 1896.
19. Report of entomologist, Pt. I. By T. D. A. Cockerell. Apr., 1896.
20. Seeds. By George Vestal. Dec., 1896.
21. Results of experiments at the San Juan substation. By H. H. Griffin. Jan., 1897.
22. Alkali in the Rio Grande and Animas Valleys. By Arthur Goss and H. H. Griffin. Mar., 1897.
23. Sugar beets. By C. T. Jordan. Apr., 1897.
24. Life zones in New Mexico [I]. By T. D. A. Cockerell. Aug., 1897.
25. Preliminary notes on the codling moth. By T. D. A. Cockerell. Feb., 1898.
26. New Mexico sugar beets, 1897. By Arthur Goss. June, 1898.
27. Report on plums. By George Vestal and Fabian Garcia. June, 1898.
28. Life zones in New Mexico: II, The zonal distribution of Coleoptera. By T. D. A. Cockerell. Dec., 1898.
29. New Mexico sugar beets, 1898. By Arthur Goss and A. M. Holt. May, 1899.
30. The effect of spring frosts on the peach crop, with cultural notes on the peach in New Mexico. By Fabian Garcia. May, 1899.
31. A study of soil moisture. By C. A. Keffer and J. D. Tinsley. Dec., 1899.
32. Grasses and forage crops. By C. A. Keffer. Dec., 1899.
33. Notes from the San Juan substation. By C. E. Mead. Apr., 1900.
34. Principles of water analyses as applied to New Mexico waters. By Arthur Goss. June, 1900.
35. Observations on insects. By T. D. A. Cockerell. Oct., 1900.
36. Announcement to New Mexico ranchmen and list of bulletins. By F. W. Sanders. Oct., 1900. Revised June, 1918.
37. Notes on the food of birds. By T. D. A. Cockerell. Mar., 1901.
38. Soil and soil moisture investigations for the season of 1900. By J. D. Tinsley and J. J. Vernon. May, 1901.
39. Orchard notes. By Fabian Garcia. May, 1901.
40. A southern New Mexico flower garden. By F. E. Lester. Nov., 1901.
41. Spraying orchards for the codling moth. By Fabian Garcia. Mar., 1902.
42. Alkali. By J. D. Tinsley. Apr., 1902.
43. Drainage and flooding for the removal of alkali. By J. D. Tinsley. June, 1902.
44. Ash analyses of some New Mexico plants. By Arthur Goss. Mar., 1903.
45. Pumping for irrigation from wells. By J. J. Vernon and F. E. Lester. Apr., 1903.
46. Soil moisture investigations for the seasons of 1901 and 1902. By J. J. Vernon and J. D. Tinsley. May, 1903.
47. Shade trees and other ornamentals. By Fabian Garcia. June, 1903.
48. Soil moisture investigations for the season of 1903. By J. D. Tinsley and J. J. Vernon. Sept., 1903.
49. Cañalgre. By R. F. Hare. Dec., 1903.
50. Steer and lamb feeding. By J. J. Vernon. Feb., 1904.
51. Native ornamental plants of New Mexico. By E. O. Wooton. May, 1904. See 87.
52. Onion culture. By Fabian Garcia. Sept., 1904. Also Spanish edition.
53. Pumping for irrigation: A fuel test of crude oil, kerosene and gasoline. By J. J. Vernon, F. E. Lester, and H. C. McLallen. Oct., 1904.
54. Soil moisture investigations for the season of 1904. By J. D. Tinsley and J. J. Vernon. Mar., 1905.
55. Tuberculosis in cattle and tuberculin tests of the station herd. By J. M. Scott. June, 1905.
56. The duty of well water and the cost and profit on irrigated crops in the Rio Grande Valley. By J. J. Vernon, A. E. Lovett, and J. M. Scott. Nov., 1905.
57. Steer feeding. By J. J. Vernon and J. M. Scott. Jan., 1906.
58. European grapes. By Fabian Garcia. Apr., 1906.
59. Forty years of southern New Mexico climate. By J. D. Tinsley. May., 1906.
60. Prickly pear and other cacti as food for stock, II. By David Griffiths and R. F. Hare. Nov., 1906.
61. Dry farming in New Mexico. By J. J. Vernon. Jan., 1907.
62. Pig feeding. By J. J. Vernon and J. M. Scott. Feb., 1907.
63. Melon culture. By Fabian Garcia. Mar., 1907.
64. The tuna as food for man. By R. F. Hare and David Griffiths. Apr., 1907.
65. Codling moth investigations during 1903 and 1904. By Fabian Garcia. May, 1907.
66. The range problem in New Mexico. By E. O. Wooton. Apr., 1908.
67. Chile culture. By Fabian Garcia. May, 1908.
68. Injurious insects. By Fabian Garcia. Aug., 1908.
69. Experiments on the digestibility of prickly pear by cattle. By R. F. Hare. Sept., 1908.
70. Sweet potato culture. By Fabian Garcia. Apr., 1909.
71. The small irrigation pumping plant. By B. P. Fleming. May, 1909.
72. Denatured alcohol from tunas and other sources. By R. F. Hare, S. R. Mitchell and A. P. Bjerregaard. Aug., 1909.
73. Tests of pumping plants in New Mexico, 1908-9. By B. P. Fleming and J. B. Stoneking. Nov., 1909.
74. Onion tests, 1905-1909. By Fabian Garcia. Jan., 1910.
75. Apple culture under irrigation. By Fabian Garcia. Feb., 1910.
76. Peach experiments 1906-1910. By Fabian Garcia and J. E. Mundell. Mar., 1911.
77. Tests of centrifugal pumps. By P. B. Fleming and J. B. Stoneking. Apr., 1911.
78. Cacti in New Mexico. By E. O. Wooton. May, 1911.
79. Alfalfa and corn for fattening lambs. By H. H. Simpson. June, 1911.
80. A study of the carbohydrates in the prickly pear and its fruits. By R. F. Hare. Sept., 1911.
81. The grasses and grass-like plants of New Mexico. By E. O. Wooton and P. C. Standley. Dec., 1911.
82. Growing Denia onion seed. By Fabian Garcia. Mar., 1912.
83. Composition of some New Mexico waters, with a discussion of their fitness for irrigation and domestic purposes. By R. F. Hare and S. R. Mitchell. June, 1912.
84. Wheat growing under irrigation. By E. P. Humbert. Nov., 1912.
85. Grape crown-gall investigations. By Fabian Garcia and J. W. Rigney. Jan., 1913.
86. Soil moisture. By R. E. Willard and E. P. Humbert. Apr., 1913.
87. Trees and shrubs of New Mexico. By E. O. Wooton. June, 1913. Supersedes 51.
88. Preliminary tank experiments on the movement, changes in composition, and toxic effect on wheat of certain salts in sandy loam and adobe soils. By R. F. Hare.—Soil analyses. By A. A. Laferriere and José Quintero. Oct., 1913.
89. Hardiness of fruit buds and flowers to frost. By Fabian Garcia and J. W. Rigney. Feb., 1914.

90. Alfalfa pasture for pigs. By Luther Foster and H. H. Simpson. May, 1914.  
 91. The utilization of feed by range steers of different ages: I, Alfalfa hay. By F. W. Christensen and H. H. Simpson. June, 1914.  
 92. Onions, spinach, cauliflower and casabas. By Fabian Garcia and J. W. Rigney. Jan., 1915.  
 93. Soil physics and soil moisture in relation to first years' growth of alfalfa. By L. R. McNeely and G. W. Kable. Mar., 1915.  
 94. The grape leafhopper. By D. E. Merrill. Apr., 1915.  
 95. Probable combination of the chlorine ions in alkali salts: A review and discussion of some of the methods for the determination of alkali in soils. By R. F. Hare. Apr., 1915.  
 96. Alfalfa hay for hogs. By Luther Foster and H. H. Simpson. June, 1915.  
 97. Tests of submerged orifice headgates for the measurement of irrigation water. By F. L. Bixby. June, 1915.  
 98. Economic feeding for milk production in New Mexico. By Luther Foster and R. W. Latta. June, 1915.  
 99. Peas as an orchard green manure and cover crop. By Fabian Garcia. Nov., 1915.  
 100. Winter protection of the vinifera grape. By Fabian Garcia and J. W. Rigney. Jan., 1916.  
 101. Feeding range steers. By Luther Foster and H. H. Simpson. Mar., 1916.  
 102. Grasshopper control. By D. E. Merrill. Apr., 1916.  
 103. The utilization of feed by range steers of different ages: II, Alfalfa hay and milo maize meal. By F. W. Christensen, H. H. Simpson, and Luther Foster. June, 1916.  
 104. Dry farming in eastern New Mexico [1909-1916]. By J. E. Mundell and H. G. Smith. Feb., 1917.  
 105. New Mexico beans. By Fabian Garcia [and others]. Mar., 1917.  
 106. The bean beetle (*Epilachna corrupta* Muls.). By D. E. Merrill. Apr., 1917.  
 107. Sugar beet culture. By R. L. Stewart. May, 1917.  
 108. The utilization of dry farm crops in beef production. By Luther Foster and H. G. Smith. Aug., 1917.  
 109. Wheat. By R. L. Stewart [and others]. Feb., 1918.  
 110. Nine year band record of the codling moth. By J. W. Rigney and A. B. Fite. Mar., 1918.  
 111. Sudan grass. By R. L. Stewart and Luther Foster. Apr., 1918.  
 112. Baby beef. By Luther Foster and E. J. Maynard. May, 1918.  
 113. Climate in relation to crop adaptation in New Mexico. By C. E. Linney and Fabian Garcia. June, 1918.  
 114. Range cow maintenance on yucca and sotol. By Luther Foster and C. W. Humble.—Collection, preparation, and feeding of soapweed under practical range conditions on the Jornada range reserve. By C. L. Forsling. July, 1918.  
 115. La cebolla, el ajo y la espinaca. By Fabian Garcia. Aug., 1918.  
 116. The peach twig borer (*Anarsia lineatella* Zell.). By D. E. Merrill. Oct., 1918.  
 117. Poultry feeding experiment. By R. B. Thompson. Oct., 1918.  
 118. Cabbage culture. By J. W. Rigney. Apr., 1919.  
 119. Sorghums for silage and hay. By R. L. Stewart. Apr., 1919.  
 120. Cotton growing. By R. L. Stewart. Dec., 1919.  
 121. Fusarium wilt of chile pepper. By L. H. Leonian. Dec., 1919.  
 122. Dairy cow feeding experiments: Corn silage versus alfalfa hay, dried beet pulp versus corn silage. By Luther Foster and J. E. Meeks. Feb., 1920.  
 123. Soil, moisture movement in relation to growth of alfalfa. By C. A. Thompson and E. L. Barrows. Feb., 1920.

## NEW YORK.

Cornell University Agricultural Experiment Station, Ithaca.<sup>12</sup>

## BULLETINS.

1. Experimental dairy house. By I. P. Roberts. May, 1888.  
 2. [Feeding lambs for fat and lean.] By I. P. Roberts [and B. de Barros]. Aug., 1888.  
 3. The insectary of Cornell University; on preventing the ravages of wireworms; on the destruction of plum curculio by poisons. By J. H. Comstock. Nov., 1888.  
 4. Growing corn for fodder and ensilage; economic seed manure; Curwin's hog powder. By I. P. Roberts. Dec., 1888.  
 5. On the production of lean meat in mature animals; does heating milk affect the quality or quantity of butter? By I. P. Roberts. Apr., 1889.  
 6. On the determination of hygroscopic water in air-dried fodders; the determination of nitrogen by the azotometric treatment of the solution resulting from the Kjeldahl digestion; fodders and feeding stuffs. By W. P. Cutter. June, 1889.  
 7. On the influences of certain conditions upon the sprouting of seeds. By L. H. Bailey. July, 1889.  
 8. On the effect of different rations on fattening lambs. By I. P. Roberts and H. H. Wing. Aug., 1889.  
 9. A study of windbreaks in their relations to fruit growing. By L. H. Bailey. Sept., 1889.  
 10. Tomatoes. [By L. H. Bailey]. Oct., 1889.  
 11. On a saw-fly borer in wheat. By J. H. Comstock. Nov., 1889.  
 12. A new apparatus for drying substances in hydrogen and for the extraction of the fat. By G. C. Caldwell. Dec., 1889.  
 13. On the deterioration of farmyard manure by leaching and fermentation; on the effect of a grain ration for cows at pasture. By I. P. Roberts and H. H. Wing. Dec., 1889.  
 14. On the strawberry leaf blight; on another disease of the strawberry. By W. R. Dudley. Dec., 1889.  
 15. Sundry investigations made during the year. By W. P. Cutter [and others]. Dec., 1889.  
 16. Growing corn for fodder and ensilage. By I. P. Roberts and H. H. Wing. Mar., 1890.  
 17. A description of Cochran's method for the determination of fat in milk, for the use of dairymen. By G. C. Caldwell. May, 1890.  
 18. Experiences in spraying plants. By L. E. Bailey. July, 1890.  
 19. Reports upon the condition of fruit growing in western New York. By L. H. Bailey. Aug., 1890.  
 20. Cream raising by dilution; variations in fat of milk served to customers in dipping from cans. By H. H. Wing and C. D. Smith. Sept., 1890.  
 21. Tomatoes. By L. H. Bailey and W. M. Munson. Oct., 1890.  
 22. On the effect of a grain ration for cows at pasture. By I. P. Roberts and H. H. Wing. Nov., 1890.  
 23. Insects injurious to fruits. By J. H. Comstock and M. V. Slingerland. Dec., 1890.  
 24. The clover rust. By J. K. Howell. Dec., 1890.  
 25. Sundry investigations made during the year. By Harry Snyder [and others]. Dec., 1890.

<sup>12</sup> The Agricultural Experiment Station at Cornell University was established in 1879. Prior to its reorganization in 1888, three reports giving results of the work were issued.

26. Experiences with eggplants. By L. H. Bailey and W. M. Munson. Mar., 1891.
27. The production and care of farm manures. By I. P. Roberts. May, 1891.
28. Experiments in the forcing of tomatoes. By L. H. Bailey. June, 1891.
29. Cream raising by dilution; the effect of a delay in setting on the efficiency of creaming; application of Dr. Babcock's centrifugal method to the analysis of milk, skim milk, buttermilk, and butter; the relation of fibrin to the effectual creaming of milk. By Harry Snyder. July, 1891.
30. Some preliminary studies of the influence of the electric arc lamp upon greenhouse plants. By L. H. Bailey. Aug., 1891.
31. The forcing of English cucumbers. By L. H. Bailey. Sept., 1891.
32. Tomatoes. By L. H. Bailey and E. G. Lodeman. Oct., 1891.
33. Wireworms. By J. H. Comstock and M. V. Slingerland. Nov., 1891. See 50.
34. Dewberries. By L. E. Bailey. Nov., 1891.
35. Combinations of fungicides and insecticides, and some new fungicides. By E. G. Lodeman. Dec., 1891.
36. On the effect of a grain ration for cows at pasture. By I. P. Roberts and H. H. Wing. Dec., 1891.
37. Sundry investigations made during the year. By Harry Snyder [and others]. Dec., 1891.
38. The cultivated native plums and cherries. By L. H. Bailey. Jan., 1892.
39. Creaming and aerating milk. By H. H. Wing. July, 1892.
40. Removing tassels from corn. By G. C. Watson. July, 1892.
41. On the comparative merits of steam and hot water for greenhouse heating. By F. W. Card and L. H. Bailey. Aug., 1892.
42. Second report upon electro-horticulture. By L. H. Bailey. Sept., 1892.
43. Some troubles of winter tomatoes. By L. H. Bailey. Sept., 1892.
44. The pear-tree psylla. By M. V. Slingerland. Oct., 1892.
45. Tomatoes. By L. H. Bailey and L. C. Corbett. Oct., 1892.
46. Mulberries. By L. H. Bailey. Nov., 1892.
47. Feeding lambs and pigs. By I. P. Roberts and G. C. Watson. Dec., 1892.
48. Spraying apple orchards in a wet season. By E. G. Lodeman. Dec., 1892.
49. Sundry investigations of the year. By G. C. Caldwell [and others]. Dec., 1892.
50. The bud moth. By M. V. Slingerland. Mar., 1893. See 107.
51. Four new types of fruits: *Prunus simonii*, Crandall currant, wineberry, dwarf Juneberry. By L. H. Bailey. Apr., 1893.
52. Cost of milk production; variation in individual cows. By H. H. Wing.—Fertilizers. By G. C. Watson, May, 1893.
53. Œdema of the tomato. By G. F. Atkinson. May, 1893.
54. Dehorning. By I. P. Roberts. June, 1893.
55. Greenhouse notes for 1892-93: Third report upon electro-horticulture; winter cauliflowers; second report upon steam and hot-water heating. By L. H. Bailey. July, 1893.
56. The production of manure. By G. C. Watson. Aug., 1893.
57. Raspberries and blackberries. By F. W. Card. Sept., 1893.
58. The four-lined leaf bug (*Poecilocapsus lineatus*). By M. V. Slingerland. Oct., 1893.
59. Does mulching retard the maturity of fruits? By L. H. Bailey. Nov., 1893.
60. The spraying of orchards. By E. G. Lodeman. Nov. 1893.
61. Sundry investigations of the year. By G. F. Atkinson [and others]. Dec. 1893.
62. The Japanese plums in North America. By L. H. Bailey. Jan., 1894.
63. Cooperative test of sugar beets. By I. P. Roberts. Mar., 1894.
64. On certain grass-eating insects: A synopsis of the species of Crambus of the Ithaca fauna. By E. P. Felt. Mar., 1894.
65. Tuberculosis in relation to animal industry and public health. By James Law. Apr., 1894.
66. Test of cream separators. By H. H. Wing. May, 1894.
67. Some recent Chinese vegetables. By L. H. Bailey. June, 1894.
68. The cultivated poplars, with remarks upon the planting of grounds. By L. H. Bailey. Aug., 1894.
69. Hints on the planting of orchards. By L. H. Bailey. Aug., 1894.
70. The native dwarf cherries. By L. H. Bailey. Aug., 1894.
71. Apricot growing in western New York. By L. H. Bailey. Aug., 1894.
72. The cultivation of orchards. By L. H. Bailey. Sept., 1894. Second edition, Jan., 1899.
73. Leaf-curl and plum pockets. By G. F. Atkinson. Sept. 1894.
74. Impressions of the peach industry in western New York. By L. H. Bailey. Oct., 1894.
75. Peach yellows. By L. H. Bailey. Oct., 1894.
76. Some grape troubles of western New York. By E. G. Lodeman. Nov., 1894.
77. The grafting of grapes. By E. G. Lodeman. Nov., 1894.
78. The cabbage root maggot, with notes on the onion maggot and allied insects. By M. V. Slingerland. Nov., 1894.
79. Varieties and leaf blight of the strawberry. By L. H. Bailey. Dec., 1894.
80. The quince in western New York. By L. H. Bailey. Dec., 1894.
81. Black knot of plums and cherries, and methods of treatment. By E. G. Lodeman. Dec., 1894.
82. Experiments with tuberculin on nontuberculous cows. By James Law. Dec., 1894.
83. A plum scale in western New York. By M. V. Slingerland. Dec., 1894.
84. The recent apple failures of western New York. By L. H. Bailey. Jan., 1895.
85. Whey butter. By H. H. Wing. Mar., 1895.
86. The spraying of orchards: Apples, quinces, plums. By E. G. Lodeman. Mar., 1895.
87. The dwarf lima beans. By L. H. Bailey. Apr. 1895.
88. Early lamb raising. By G. C. Watson. Apr., 1895.
89. Feeding pigs. By G. C. Watson. May, 1895.
90. The China asters, with remarks upon flower beds. By L. H. Bailey. Apr., 1895.
91. Recent chrysanthemums. By Michael Barker. Apr., 1895.
92. On the effect of feeding fat to cows. By H. H. Wing. May, 1895.
93. The cigar case-bearer in western New York. By M. V. Slingerland. May, 1895. Reprint, May, 1895.
94. Damping off. By G. F. Atkinson. May, 1895.
95. Winter muskmelons. By L. H. Bailey. June, 1895.
96. Foreign house miscellaneous. By L. H. Bailey and E. G. Lodeman. June, 1895.
97. Studies in artificial cultures of entomogenous fungi. By R. H. Pettit. July, 1895.
98. Cherries. By L. H. Bailey and G. H. Powell. July, 1895.
99. Blackberries. By L. H. Bailey. Aug., 1895.
100. Evaporated raspberries in western New York. By L. H. Bailey. Sept., 1895.
101. Notions about the spraying of trees, with remarks on the canker-worm. By L. H. Bailey. Sept., 1895.
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370. Forest legislation in America prior to March 4, 1789. By J. P. Kinney. Jan., 1916.
371. The leaf blotch of horse-chestnut. By V. B. Stewart. Feb., 1916.
372. Reports on scale insects. By J. H. Comstock. Mar., 1916.
373. Metallic flavor in dairy products. By E. S. Guthrie. Apr., 1916.
374. Reforesting methods and results of forest planting in New York State. By B. H. Paul. Apr., 1916.
375. Possibilities of private forest management in New York State. By C. H. Guise. Apr., 1916.
376. The army-worm in New York in 1914 (*Leucania unipuncta* Haworth). By H. H. Knight, May, 1916.
377. Cost accounts on some New York farms. By C. E. Ladd. June, 1916.
378. The lesser migratory locust (*Melanoplus atlantis* Riley). By G. W. Herrick and C. H. Hadley, jr. July, 1916.
379. Black rot, leaf spot, and canker of pomaceous fruits. By L. R. Hesler. Aug., 1916.
380. The hard rot disease of gladiolus. By L. M. Massey. Sept., 1916.
381. Leafsmut of timothy. By G. A. Osner. Oct., 1916.
382. Sun-scald of fruit trees, a type of winter injury. By A. J. Mix. Oct., 1916.
383. The pine bark beetle (*Ips pini* Say). By W. A. Clemens. Oct., 1916.
384. Some effects of oxygen and carbon dioxide on nitrification and ammonification in soils. By J. K. Plummer. Dec., 1916.
385. Dusting and spraying nursery stock. By V. B. Stewart. Jan., 1917.
386. Physiological studies of *Bacillus radicicola* of soybean (*Soja max* Piper) and of factors influencing nodule production. By J. K. Wilson. Jan., 1917.
387. Studies on clubroot of cruciferous plants. By Charles Chupp. Mar., 1917.
388. The poplar and willow borer (*Cryptorhynchus lapathi* Linnaeus). By Robert Matheson. Apr., 1917.
389. Clarification of milk. By T. J. McInerney. Apr., 1917.

390. Three cedar rust fungi, their life histories and the diseases they produce. By J. L. Weimer. May, 1917.
391. A revision of the genus *Lygus* as it occurs in America north of Mexico, with biological data on the species from New York. By H. H. Knight. May, 1917.
392. Heredity studies in the morning-glory (*Ipomoea purpurea* [L.] Roth). By E. E. Barker. July, 1917.
393. Factors influencing the abscission of flowers and partially developed fruits of the apple (*Pyrus malus* L.). By A. J. Heinicke. July, 1917.
394. The decomposition of sweet clover (*Melilotus alba* Desr.) as a green manure under greenhouse conditions. By L. A. Maynard. Nov., 1917.
395. The anthracnose disease of the raspberry and related plants. By W. H. Burkholder. Nov., 1917.
396. An investigation of the scarring of fruit caused by apple redbugs. By H. H. Knight. Feb., 1918.
397. The refinement of feeding experiments for milk production by the application of statistical methods. By L. A. Maynard and W. I. Myers. Apr., 1918.
398. Feed consumed in milk production. By H. A. Hopper, H. M. Bowen, and F. S. Barlow. Oct., 1918.
399. Experiments in fertilizing a crop rotation. By T. L. Lyon. Feb., 1919.
400. A comparison of fat tests in milk as determined by a cow-testing association and by a creamery. By H. C. Troy. Jan., 1920.
401. A comparative study of some methods for determining the fat content of skim milk. By T. J. McInerney and H. C. Troy. Jan., 1920.
402. The apple maggot in New York (*Rhagoletis pomonella* Walsh). By G. W. Herrick. Mar., 1920.

## MEMOIRS.

1. Some relations of certain higher plants to the formation of nitrates in soils. By T. L. Lyon and J. A. Bizzell. July, 1913.
2. The action of certain nutrient and nonnutrient bases on plant growth; The antitoxic action of certain nutrient and nonnutrient bases with respect to plants; the toxicity of manganese and the antidotal relations between this and various other cations with respect to green plants; toxicity of various cations. By M. M. McCool. Aug., 1913.
3. Variation and correlation of oats (*Avena sativa*): I, Studies showing the effect of seasonal changes on biometrical constants. By H. H. Love and C. E. Leighty. Aug., 1914.
4. Variation and correlation of oats (*Avena sativa*): II, Effect of differences in environment, varieties, and methods on biometrical constants. By C. E. Leighty. Sept., 1914.
5. Physiological studies of *Bacillus radicola* of Canada field pea. By M. J. Prucha. Mar., 1915.
6. Fusaria of potatoes. By C. D. Sherbakoff. May, 1915.
7. Sentie changes in leaves of *Vitis vulpina* L. and certain other plants. By H. M. Benedict. June, 1915.
8. A bacterial disease of stone fruits. By F. M. Rolfs. July, 1915.
9. Influence of certain carbohydrates on green plants. By Lewis Knudson. July, 1916.
10. A classification of the varieties of cultivated oats. By W. C. Etheridge. Oct., 1916.
11. Biology of the Membracidae of the Cayuga Lake basin. By W. D. Funkhouser. June, 1917.
12. Lysimeter experiments: Records for tanks 1 to 12 during the years 1910-1914, inclusive. By T. L. Lyon and J. A. Bizzell. June, 1918.
13. Chlorophyll inheritance in maize. By E. W. Lindstrom. Aug., 1918.
14. Stimulation of root growth in cuttings by treatment with chemical compounds. By O. F. Curtis. Aug., 1918.
15. Insects injurious to the hop in New York with special reference to the hop grub and the hop redbug. By I. M. Hawley. Nov., 1918.
16. A fifth pair of factors, *Aa*, for aleurone color in maize, and its relation to the *Cc* and *Rr* pairs. By R. A. Emerson. Nov., 1918.
17. The translocation of calcium in a soil. By B. D. Wilson. Dec., 1918.
18. A study of bacteria in ice cream during storage. By H. B. Ellenberger. Jan., 1919.
19. The effect of manganese compounds on soils and plants. By E. P. Deatrick. Feb., 1919.
20. The physiological action of nitrobenzene vapor on animals. By W. L. Chandler. Mar., 1919.
21. Studies in the reversibility of the colloidal condition of soils. By A. B. Beaumont. Apr., 1919.
22. An analysis of the costs of growing potatoes. By D. S. Fox. May, 1919.
23. The inheritance of the weak awn in certain *Avena* crosses and its relation to other characters of the oat grain. By A. C. Fraser. June, 1919.
24. A study of the plant lice injuring the foliage and fruit of the apple. By Robert Matheson. June, 1919.
25. The crane flies of New York: I, Distribution and taxonomy of the adult flies. By C. P. Alexander. June, 1919.
26. The dry root rot of the bean. By W. H. Burkholder. June, 1919.
27. The influence of low temperature on soil bacteria. By A. F. Vass. June, 1919.
28. Cooperative marketing in the Chautauque-Erie grape industry. By H. D. Phillips.—App. I, New York State laws relating to cooperative organizations.—App. II, Amendments to State and Federal anti-trust laws which affect cooperative associations organized in New York State. Sept., 1919.
29. The lecithin content of butter and its possible relationship to the fishy flavor. By G. C. Supple. Nov., 1919.
30. Phosphorus in butter. By J. T. Cusick. Apr., 1920.
31. A study of selections for the size, shape, and color of hens' eggs. By E. W. Benjamin. May, 1920.
32. The carbon dioxide of the soil air. By H. W. Turpin. Apr., 1920.
33. The ribbed pine borer. By W. N. Hess. May, 1920.
34. An economic study of farm layout. By W. I. Myers. June, 1920.
35. Some effects of potassium salts on soils. By R. S. Smith. June, 1920.
36. Resistance of the roots of some fruit species to low temperature. By D. B. Carrick. June, 1920.
37. A modified Babcock method for determining fat in butter. By N. W. Hepburn. June, 1920.
38. The crane-flies of New York: II, Biology and phylogeny. By C. P. Alexander. June, 1920.

New York Agricultural Experiment Station, Geneva.

BULLETINS [FIRST SERIES]<sup>13</sup>

1. [Outline of experiments in progress.] By E. L. Sturtevant. July 24, 1882.
2. [Experiments with seed potatoes cut in different ways.] By E. L. Sturtevant. July 29, 1882.
3. [Corn experiments; root system of the potato plant; analyses of pigweed (*Chenopodium album*).] By E. L. Sturtevant. Aug. 5, 1882.
4. [Condition of crops on the station farm; results of wheat experiments.] By E. L. Sturtevant. Aug. 12, 1882.

<sup>13</sup> Bulletins 1-115 of this series were printed as newspaper slips.

5. [Effect of tillage upon the rate of evaporation; variety tests of peas, cabbage, and tomatoes; analysis of the root of red weed (*Amaranthus retroflexus*.)] By E. L. Sturtevant. Aug. 19, 1882.
6. [Experiments with corn, potatoes, sorghum, cabbage, and squash; the cabbage worm.] By E. L. Sturtevant. Aug. 26, 1882.
7. [Yield of potatoes from seed cut in different ways; Pacy's ray grass; *Soja hispida* or Japanese bean; analyses of cowpeas.] By E. L. Sturtevant. Sept. 2, 1882.
8. [Sorghum, teosinte, pearl millet, Chinese bean, cowpeas; tomato rot; varieties of peas.] By E. L. Sturtevant. Sept. 9, 1882.
9. [Sorghum; dhoura; filling the silo with corn; effect of tillage on evaporation; cucumbers.] By E. L. Sturtevant. Sept. 16, 1882.
10. [Soja bean; pasture grasses; improvement of seed wheat; analysis of the tomato; sugar in the stalks of field corn.] By E. L. Sturtevant. Sept. 23, 1882.
11. [Prolificacy of plants.] By E. L. Sturtevant. Sept. 30, 1882.
12. [Variety tests of barley; specimens of corn desired for the museum.] By E. L. Sturtevant. Oct. 7, 1882.
13. [Experiments with butt and tip kernels for seed in fertilized and unfertilized soil.] By E. L. Sturtevant. Oct. 14, 1882.
14. [A retrospect of the summer's work; the Christiana melon.] By E. L. Sturtevant. Oct. 20, 1882.
15. [Corn hybridization; cultivation experiments.] By E. L. Sturtevant. Oct. 28, 1882.
16. [Variety tests of cabbage; insecticides for the cabbage worm.] By E. L. Sturtevant. Nov. 4, 1882.
17. [Root systems of plants in relation to fertilizer requirements.] By E. L. Sturtevant. Nov. 10, 1882.
18. [Experiments with seed potatoes cut in different ways.] By E. L. Sturtevant. Nov. 24, 1882.
19. [Potato culture.] By E. L. Sturtevant. Nov. 25, 1882.
20. [Clover sickness.] By E. L. Sturtevant.—Tobacco in Onondaga and adjacent counties. By J. F. Greene. Dec. 2, 1882.
21. [Amber cane.] By E. L. Sturtevant. Dec. 9, 1882.
22. [Sugar from corn stalks.] By E. L. Sturtevant. Dec. 16, 1882.
23. [Seed testing.] By E. L. Sturtevant. Dec. 23, 1882.
24. [The germination of butt, tip, and central kernels of corn.] By E. L. Sturtevant. Dec. 30, 1882.
25. [Milk analyses.] By E. L. Sturtevant. Jan. 6, 1883.
26. [Corn germination experiments.] By E. L. Sturtevant. Jan. 13, 1883.
27. [Suggestions for cooperative experiments with corn.] By E. L. Sturtevant. Jan. 20, 1883.
28. [Potato experiments.] By E. L. Sturtevant. Jan. 27, 1883.
29. [Seed improvement; sorghum; cowpeas; soja beans.] By E. L. Sturtevant. Feb. 3, 1883.
30. [Improvement of varieties.] By E. L. Sturtevant. Feb. 10, 1883.
31. [Planting corn from different parts of the ear.] By E. L. Sturtevant. Feb. 17, 1883.
32. [Corn culture.] By E. L. Sturtevant. Feb. 24, 1883.
33. [Influence of feeds upon the composition of milk.] By E. L. Sturtevant. Mar. 3, 1883.
34. [Feeding experiments with cows.] By E. L. Sturtevant. Mar. 10, 1883.
35. [Effect of feed upon the yield of milk.] By E. L. Sturtevant. Mar. 13, 1883.
36. [Feeding experiments with cows.] By E. L. Sturtevant. Mar. 24, 1883.
37. [Digestibility of corn silage.] By E. L. Sturtevant. Mar. 31, 1883.
38. [Effect of using seed from different parts of the plant.] By E. L. Sturtevant. Apr. 7, 1883.
39. [Tests of seeds.] By E. L. Sturtevant. Apr. 14, 1883.
40. [The weather during the winter of 1882-83.] By E. L. Sturtevant. Apr. 21, 1883.
41. [The cutting of seed potatoes.] By E. L. Sturtevant. Apr. 28, 1883.
42. [Fertilizer analyses.] By E. L. Sturtevant. May 5, 1883.
43. [Observations on cross fertilization.] By E. L. Sturtevant. May 12, 1883.
44. [Variations in seedling plants.] By E. L. Sturtevant. May 19, 1883.
45. [Germination tests of wheat.] By E. L. Sturtevant. May 26, 1883.
46. [Variations in pop-corn.] By E. L. Sturtevant. June 2, 1883.
47. [The germinative strength of corn.] By E. L. Sturtevant. June 9, 1883.
48. [Experiments with insecticides.] By E. L. Sturtevant. June 16, 1883.
49. [Grass experiments.] By E. L. Sturtevant. June 23, 1883.
50. [Seed improvements.] By E. L. Sturtevant. June 29, 1883.
51. [Principles of seed selection.] By E. L. Sturtevant. July 7, 1883.
52. [Variety tests of peas.] By E. L. Sturtevant. July 14, 1883.
53. [Variety studies.] By E. L. Sturtevant. July 21, 1883.
54. [Peach leaf curl.] By E. L. Sturtevant. July 28, 1883.
55. [Varieties of corn.] By E. L. Sturtevant. Aug. 4, 1883.
56. [Value of soil analysis.] By E. L. Sturtevant. Aug. 11, 1883.
57. [Ash analysis of the corn plant.] By E. L. Sturtevant. Aug. 18, 1883.
58. [Analyses of plantain and ox-eye daisy.] By E. L. Sturtevant. Aug. 25, 1883.
59. [Variations in plants.] By E. L. Sturtevant. Sept. 5, 1883.
60. [Proposed corn nomenclature.] By E. L. Sturtevant. Sept. 8, 1883.
61. [Root pruning of barley.] By E. L. Sturtevant. Sept. 15, 1883.
62. [Seed tests.] By E. L. Sturtevant. Sept. 22, 1883.
63. [Experiments with insecticides.] By E. L. Sturtevant. Sept. 29, 1883.
64. [Experiments with potato seed from different parts of the tuber.] By E. L. Sturtevant. Oct. 6, 1883.
65. [Mulching potatoes.] By E. L. Sturtevant. Oct. 13, 1883.
66. [Flat experiments with potatoes.] By E. L. Sturtevant. Oct. 20, 1883.
67. [Other crops with corn.] By E. L. Sturtevant. Nov. 3, 1883.
68. [Sunflowers.] By E. L. Sturtevant. Nov. 10, 1883.
69. [Variety tests of potatoes.] By E. L. Sturtevant. Nov. 17, 1883.
70. [Analyses of the corn kernel.] By E. L. Sturtevant. Nov. 24, 1883.
71. [Effect of fertilizers upon the composition of tobacco.] By E. L. Sturtevant. Dec. 1, 1883.
72. [Variations in corn due to cross-fertilization.] By E. L. Sturtevant. Dec. 8, 1883.
73. [Analyses of corn, alfalfa, orchard grass, and hay.] By E. L. Sturtevant. Dec. 15, 1883.
74. [Experiments with seed corn.] By E. L. Sturtevant. Dec. 22, 1883.
75. [Apple maggot.] By J. A. Lindner. Dec. 29, 1883.
76. Maize. Jan. 5, 1883 [i. e. 1884].
77. [Onions; strawberries; root system of cauliflower.] By E. L. Sturtevant. Jan. 12, 1883 [i. e. 1884].
78. [Sorghum—field and chemical composition.] By E. L. Sturtevant. Jan. 19, 1883 [i. e. 1884].
79. [Coal analyses.] By E. L. Sturtevant. Feb. 23, 1883.
80. [Influence of climate upon the action of fertilizer in its relation to crop.] By E. L. Sturtevant. Mar. 8, 1884.
81. [Celery; tomatoes.] By E. L. Sturtevant. Mar. 22, 1884.
82. [Corn analyses.] By E. L. Sturtevant. Apr. 5, 1884.

83. [Varieties of sweet corn.] By E. L. Sturtevant. Apr. 12, 1884.  
 84. [Feeding silage to cows.] By E. L. Sturtevant. Apr. 26, 1884.  
 85. [Digestibility of corn fodder and the same ensilage.] By E. L. Sturtevant. Apr. 26, 1884.  
 86. [Corn cutworms.] By J. A. Lintner. May 31, 1884.  
 87. [Varieties of early peas.] By E. L. Sturtevant. July 2, 1884.  
 88. [Insecticides for the turnip flea-beetle (*Haltica striolata*) and the radish fly (*Anthomya radicum*).] By E. L. Sturtevant. July 9, 1884.  
 88. [i. e. 89.] [Cross fertilization of beans.] By E. L. Sturtevant. July 16, 1884.  
 88. [i. e. 90.] [Insecticides.] By E. L. Sturtevant. July 23, 1884.  
 91. [Varieties of vegetables.] By E. L. Sturtevant. July 30, 1884.  
 92. [Pear blight.] By J. C. Arthur. Aug. 6, 1884.  
 93. [Corn analyses.] By E. L. Sturtevant. Aug. 13, 1884.  
 94. [Varieties of raspberries.] By E. S. Goff. Aug. 20, 1884.  
 95. [Ripe versus immature seed.] By E. L. Sturtevant. Aug. 27, 1884.  
 [96.] [List of station products exhibited at the New York State Agricultural Society's fair, Sept. 4-10, 1884.] By E. L. Sturtevant.  
 97. Smut in oats. By E. L. Sturtevant. Sept. 6, 1884.  
 98. [Varieties of tomatoes.] By E. L. Sturtevant. Sept. 13, 1884.  
 99. [Hybridized barley.] By E. L. Sturtevant. Sept. 27, 1884.  
 99. [i. e. 100.] [An insect new to the State, *Isosoma tritici*.] By J. A. Lintner. Oct. 4, 1884.  
 101. [The root systems of certain vegetables.] By E. L. Sturtevant. Oct. 11, 1884.  
 102. [Varieties of oats.] By E. L. Sturtevant. Oct. 22, 1884.  
 103. [Calculation of yield of corn per acre.] By E. L. Sturtevant. Nov. 5, 1884.  
 104. [Effect of brewers' grains on the composition of milk.] By E. L. Sturtevant. Nov. 12, 1884.  
 105. [Varieties of barley.] By E. L. Sturtevant. Nov. 19, 1884.  
 106. Influence of acid and putrefactive food upon cows and their milk; Brewers' grains. By E. L. Sturtevant. Nov. 22, 1884.  
 107. [The policy of the station.] By E. L. Sturtevant. Jan. 3, 1885.  
 108. [Variability in the yield of potatoes.] By E. L. Sturtevant. Jan. 10, 1885.  
 109. [Selection of seed potatoes.] By E. L. Sturtevant. Jan. 17, 1885.  
 110. Influence of feeding acid food to cows: Corn feed or slump. By E. L. Sturtevant. Feb. 14, 1885.  
 111. [Causes of the failure of corn to germinate.] By E. L. Sturtevant. Mar. 13, 1885.  
 112. [Experiments with dried seed corn.] By E. L. Sturtevant. Apr. 11, 1885.  
 113. [Nomenclature of feeding stuffs which are by-products from glucose and starch factories.] By E. L. Sturtevant. Apr. 18, 1885.  
 114. [Influence of feeding acid food to cows: Dry feed with acetic acid.] By E. L. Sturtevant. Apr. 25, 1885.  
 115. The absorption of the seed tuber of the potato during growth of the plant. [By E. S. Goff.] Mar. 18, 1885.

## BULLETINS (NEW SERIES).

1. [Mason's high grade potash fertilizer.] By E. L. Sturtevant. July 18, 1885. (No. 116, old series.)  
 2. [Pear blight.] By J. C. Arthur. Aug. 24, 1885.  
 3. [Varieties of vegetables exhibited by the station at the New York State Agricultural Society's fair.] By E. L. Sturtevant. Sept. 10, 1885.  
 4. [Varieties of oats.] By E. L. Sturtevant. Sept. 26, 1885.  
 5. Cooked versus raw food for stock. By E. F. Ladd. Oct. 23, 1885.  
 6. Hay versus damaged hay. By E. L. Sturtevant. Nov. 5, 1885.  
 7. Slug shot. By E. L. Sturtevant. Mar. 18, 1886.  
 8. [Kiln dried seed corn.] By E. L. Sturtevant. Apr. 15, 1886.  
 9. Was it poison or overfeeding. By E. L. Sturtevant. Mar. 1, 1887.  
 10. General outline of work: Influence of fertilizers on the chemical composition of plants; analyses of feeding stuffs; feeding and digestion experiments. By E. F. Ladd. Aug., 1888.  
 11. Experiments in cultivation; experiment in root growth; experiment with fertilizers; experiments with insecticides; experiments with fungicides; experiments with the potato; experiments with sorghum. By E. S. Goff. Sept., 1888.  
 12. Digest of the fertilizer laws in several States; statistics of fertilizers; the Maynard bill. Sept., 1888.  
 13. Farm and field experiments. By F. E. Emery. Sept., 1888.  
 14. Chemical composition of some feeding-stuffs. By E. F. Ladd. Oct., 1888.  
 15. Methods adopted for the systematic testing of new fruits; a circular to the originators or proprietors of new fruits; a list of fruits now under trial at the station. By E. S. Goff. Nov., 1888.  
 16. A study of the corn plant; lucerne or alfalfa. [By E. F. Ladd.] July, 1889.  
 17. Cattle foods and feeding rations. [By E. F. Ladd.] Oct., 1889.  
 18. Testing of dairy breeds. [By E. F. Ladd.] Nov., 1889.  
 19. A method for the determination of fat in milk and cream. [By E. F. Ladd and W. H. Whalen.] June, 1890.  
 20. Pedigrees of dairy animals under investigation. [By Peter Collier.] June, 1890.  
 21. Testing of dairy breeds. [By E. F. Ladd.] July, 1890.  
 22. Pig feeding experiments without milk. [By W. P. Wheeler.] Aug., 1890.  
 23. Comparative test of cows; loss in keeping manure. [By F. E. Emery.] Sept., 1890.  
 24. Experiments with strawberries. [By C. E. Hunn.] Oct., 1890.  
 25. The New York fertilizer control and fertilizer analyses: Introduction. [By L. L. Van Slyke.] Nov., 1890.  
 26. The New York State fertilizer control and fertilizer analyses: Outline of the history of commercial fertilizers; general principles underlying the use of fertilizers. [By L. L. Van Slyke.] Jan., 1891.  
 27. The New York State fertilizer control and fertilizer analyses: General principles underlying the use of fertilizers. [By L. L. Van Slyke.] Feb., 1891.  
 28. Pig feeding experiments with coarse foods. [By W. P. Wheeler.] Apr., 1891.  
 29. Feeding experiment with laying hens. [By W. P. Wheeler.] Apr., 1891.  
 30. Cabbage and cauliflower; tomatoes. [By C. E. Hunn.] May, 1891.  
 31. Commercial valuation of the food and fertilizing constituents of feeding materials. [By Peter Collier.] May, 1891.  
 32. The New York State fertilizer control and fertilizer analyses: Description of material used in making commercial fertilizers; fertilizing materials produced on farms; fertilizing composition and valuation of various products. [By L. L. Van Slyke.] June, 1891.  
 33. The New York State fertilizer control and fertilizer analyses: Explanation of terms of chemical analyses; commercial valuations of fertilizers; composition of various chemical compounds. [By L. L. Van Slyke.] July, 1891.  
 34. Comparison of dairy breeds of cattle with reference to production of butter. [By L. L. Van Slyke.] Aug., 1891.

35. Some of the most common fungi and insects, with preventives. [By C. E. Hunn and G. W. Churchill.] Aug., 1891.
36. Small fruits. [By C. E. Hunn.] Sept., 1891.
37. Investigation of cheese; experiments in the manufacture of cheese; influence of composition of milk on composition and yield of cheese; a study of the process of ripening of cheese. [By L. L. Van Slyke.] Nov., 1891.
38. Oyster shells as food for laying hens. [By W. P. Wheeler.] Jan., 1892.
39. Feeding experiments with poultry. [By W. P. Wheeler.] Jan., 1892.
40. Black knot of plum and cherry. [By S. A. Beach.] Mar., 1892.
41. Influence of copper compounds in soils upon vegetation; spraying with fungicides for prevention of potato blight; analyses of materials used in spraying plants. [By S. A. Beach and L. L. Van Slyke.] Apr., 1892.
42. Analyses of commercial fertilizers. [By L. L. Van Slyke.] May, 1892.
43. Experiments in the manufacture of cheese during May. [By L. L. Van Slyke.] June, 1892.
44. Strawberries. [By C. E. Hunn.] Aug., 1892.
45. Experiments in the manufacture of cheese during June. [By L. L. Van Slyke.] Aug., 1892.
46. Experiments in the manufacture of cheese. [By L. L. Van Slyke.] Sept., 1892.
47. Experiments in the manufacture of cheese: Experiments made during September; experiments made during October. [By L. L. Van Slyke.] Nov., 1892.
48. Some bean diseases. [By S. A. Beach.] Dec., 1892.
49. Treatment of potato scab; use of Bordeaux mixture for potato blight. [By S. A. Beach.] Jan., 1893.
50. Summary of results of experiments made in the manufacture of cheese during the season of 1892. [By L. L. Van Slyke.] Jan., 1893.
51. Some celery diseases. [By S. A. Beach.] Mar., 1893.
52. Analyses of commercial fertilizers. [By L. L. Van Slyke.] Mar., 1893.
53. Feeding experiments with capons. [By W. P. Wheeler.] Apr., 1893.
54. Experiments in the manufacture of cheese: Manufacture of cheese from normal milk rich in fat; study of cheese-ripening process. [By L. L. Van Slyke.] May, 1893.
55. General principles relating to the composition and use of fertilizers. [By L. L. Van Slyke.] May, 1893.
56. Experiments in the manufacture of cheese: The manufacture of Edam cheese; the manufacture of Gouda cheese. [By L. L. Van Slyke.] May, 1893.
57. Feeding experiments with laying hens; keeping males with the laying stock; observations on feather eating; general observations. [By W. P. Wheeler.] June, 1893.
58. Analyses of commercial fertilizers collected in Long Island in the spring of 1893. [By L. L. Van Slyke.] July, 1893.
59. Analyses of commercial fertilizers collected in the spring of 1893. [By L. L. Van Slyke.] Sept., 1893.
60. Investigation relating to the manufacture of cheese: I. [By L. L. Van Slyke.] Sept., 1893.
61. Investigation relating to the manufacture of cheese: II. [By L. L. Van Slyke.] Nov., 1893.
62. Investigation relating to the manufacture of cheese: III. [By L. L. Van Slyke.] Dec., 1893.
63. Some experience with blackberries, dewberries, and raspberries. [By S. A. Beach.] Dec., 1893.
64. Some experiences with strawberries; strawberry crosses. [By S. A. Beach.] Jan., 1894.
65. Investigation relating to the manufacture of cheese: Summary of the results of the work done in cheese factories during the seasons of 1892 and 1893. [By L. L. Van Slyke.] Jan., 1894.
66. Analyses of commercial fertilizers collected in the fall of 1893. [By L. L. Van Slyke.] Jan., 1894.
67. Experiments in preventing pear scab in 1893. [By S. A. Beach.] Feb., 1894.
68. Investigation relating to the manufacture of cheese: V. Fat in milk as a practical basis for determining the value of milk for cheese making. [By L. L. Van Slyke.] Mar., 1894.
69. Vegetables grown for exhibition. [By S. A. Beach.] Mar., 1894.
70. Some reasons why the legal milk standard of New York State should be changed. [By L. L. Van Slyke.] Apr., 1894.
71. Some reasons why there should be a legal standard for cheese in New York State. [By L. L. Van Slyke.] May., 1894.
72. Preventing leaf blight of plum and cherry nursery stock. [By S. A. Beach.] June, 1894.
73. Analyses of commercial fertilizers collected during the spring of 1894. [By L. L. Van Slyke.] July, 1894.
74. Observations on the application of fungicides and insecticides. [By S. A. Beach and Wendell Paddock.] Sept., 1894.
75. Some insects injurious to squash, melon, and cucumber vines; the asparagus beetle. [By V. H. Lowe.] Sept., 1894.
76. Notes on strawberries for 1894. [By S. A. Beach.] Oct., 1894.
77. Comparison of different breeds of dairy cattle: I, The cost of milk production. [By L. L. Van Slyke.] Nov., 1894.
78. Comparison of different breeds of dairy cattle: II, The cost of butter and cream production. [By L. L. Van Slyke.] Nov., 1894.
79. Comparison of different breeds of dairy cattle: III, The cost of cheese production. [By L. L. Van Slyke.] Nov., 1894.
80. Alfalfa forage for milch cows. The results from rations containing alfalfa and those obtained from some other summer rations. [By W. P. Wheeler.] Nov., 1894.
81. Variety tests with blackberries, dewberries, and raspberries; raspberry anthracnose. [By S. A. Beach and Wendell Paddock.] Dec., 1894.
82. Results of investigation relating to the manufacture of cheese for the season of 1894. [By L. L. Van Slyke.] Dec., 1894.
83. Insects affecting late cabbage; notes on the stalk borer; insecticides. [By F. A. Serrine.] Dec., 1894.
84. Spraying pear and apple orchards in 1894. [By S. A. Beach.] Jan., 1895.
85. Analyses of commercial fertilizers collected during the fall of 1894. [By L. L. Van Slyke.] Jan., 1895.
86. Treatment of common diseases and insects injurious to fruits and vegetables. [By S. A. Beach and Wendell Paddock.] Feb., 1895.
87. The San José or pernicious scale. [By F. A. Serrine.] Mar., 1895.
88. Forcing lettuce in pots; mushrooms as a greenhouse crop. [By S. A. Beach.] Mar., 1895.
89. Comparative profits derived from selling milk, butter, cream, and cheese. [By L. L. Van Slyke.] Apr., 1895.
90. Feeding experiments with laying hens. A comparison of rations containing moistened ground grain with others containing dry whole grain. [By W. P. Wheeler.] May, 1895.
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92. Analyses of commercial fertilizers collected during the spring of 1895. [By L. L. Van Slyke.] Oct., 1895.
93. Comparative field-test of commercial fertilizers used in raising potatoes. [By L. L. Van Slyke.] Oct., 1895.

94. The composition and use of fertilizers: Science applied to feeding plants. [By L. L. Van Slyke.] Oct., 1895.
95. Currants. By S. A. Beach. Nov., 1895.
96. Report of analyses of commercial fertilizers collected during the fall of 1895. By L. L. Van Slyke. Dec., 1895.
97. Corn silage for milk cows. By W. P. Wheeler. Dec., 1895.
98. Plum leaf spot; cherry leaf spot and fruit rot. By S. A. Beach. Jan., 1896.
99. The spinach-leaf maggot or miner. By F. A. Serrine. Jan., 1896.
100. Combating carnation rust. By F. C. Stewart. Feb., 1896.
101. Potato diseases on Long Island in the season of 1895. By F. C. Stewart. Feb., 1896.
102. Silage and silos. By W. P. Wheeler. Mar., 1896.
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104. Notes on the recent invasion of the army worm. By V. H. Lowe. July, 1896.
105. Effects of drouth upon milk production. By L. L. Van Slyke. Aug., 1896.
106. Feeding experiments with laying hens: The relative efficiency of whole and ground grains. By W. P. Wheeler. Aug., 1896.
107. Report of analyses of commercial fertilizers for the spring of 1896. By L. L. Van Slyke. Aug., 1896.
108. The real value of "natural plant food." By L. L. Van Slyke. Sept., 1896.
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110. Milk-fat and cheese yield. By L. L. Van Slyke. Oct., 1896.
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- 114\*. Gooseberries. By S. A. Beach. Jan. 1897.
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116. Report of analyses of commercial fertilizers for the fall of 1896. By L. L. Van Slyke. Jan., 1897.
- 117\*. Treatment of leaf spot in plum and cherry orchards in 1896. By S. A. Beach. Mar., 1897.
- 118\*. Alfalfa. By W. P. Wheeler. Mar., 1897.
- 119\*. The downy mildew of the cucumber; what it is and how to prevent it. By F. C. Stewart. Mar., 1897.
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- 121\*. Spray pumps and spraying. By Wendell Paddock. Mar., 1897. Appendix, Mar., 1899.
- 122\*. The pistol case-bearer. By V. H. Lowe. Apr., 1897.
- 123\*. Spraying potatoes on Long Island in the season of 1896. By F. C. Stewart. Apr., 1897.
- 124\*. Anthracnose of the black raspberry. By Wendell Paddock. Apr., 1897.
- 125\*. Forcing tomatoes; comparison of methods of training and benching; note on a tomato disease. By S. A. Beach. July, 1897.
- 126\*. Feeding experiments with chicks and capons: The relative efficiency of whole and ground grains as commonly fed. By W. P. Wheeler. Nov., 1897.
- 127\*. Strawberries in 1897. By Wendell Paddock. Nov., 1897.
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- 130\*. A bacterial disease of sweet corn. By F. C. Stewart. Dec., 1897.
- 131\*. Results with oat smut in 1897. By C. P. Close. Dec., 1897.
- 132\*. The source of milk fat. By W. H. Jordan and C. G. Jentner. Dec., 1897.
- 133\*. Spraying in 1897 to prevent gooseberry mildew. By C. P. Close. Dec., 1897.
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- 136\*. Inspection of nurseries and treatment of infested nursery stock. By V. H. Lowe. Dec., 1897.
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- 143\*. Cottonwood leaf beetle: green arsenite. By V. H. Lowe. Apr., 1898.
- 144\*. A spraying mixture for cauliflower and cabbage worms. By F. A. Serrine. Sept., 1898.
145. Report of analyses of commercial fertilizers for the spring of 1898. By L. L. Van Slyke. Sept., 1898.
- 146\*. Some experiments in forcing head lettuce. By S. A. Beach. Nov., 1898.
- 147\*. Variety tests of strawberries, raspberries, and blackberries. By Wendell Paddock. Dec., 1898.
148. Report of analyses of commercial fertilizers for the fall of 1898. By L. L. Van Slyke. Dec., 1898.
- 149\*. The economy of using animal food in poultry feeding. By W. P. Wheeler. Dec., 1898.
- 150\*. The raspberry sawfly; preliminary notes on the grape-vine flea beetle. By V. H. Lowe. Dec., 1898.
- 151\*. Experiments in ringing grape vines. By Wendell Paddock. Dec., 1898.
- 152\*. Two destructive orchard insects: The apple-tree tent caterpillar; spraying experiments against the spring canker worm. By V. H. Lowe. Dec., 1898.
153. Director's report for 1898. By W. H. Jordan. Dec., 1898.
- 154\*. Commercial fertilizers for potatoes, II. By W. H. Jordan. Dec., 1898.
- 155\*. Sugar beet investigations in 1898. By L. L. Van Slyke. Dec., 1898.
- 156\*. Spraying cucumbers in the season of 1898. By F. A. Serrine and F. C. Stewart. Dec., 1898.
- 157\*. Self-fertility of the grape. By S. A. Beach. Dec., 1898.
- 158\*. Combating the striped beetle on cucumbers. By F. A. Serrine. May, 1899.
- 159\*. The forest tent-caterpillar. By V. H. Lowe. Oct., 1899.
160. Report of analyses of commercial fertilizers for the spring of 1899. By L. L. Van Slyke. Oct., 1899.
- 161\*. Treatment for gooseberry mildew. By C. P. Close. Nov., 1899.
- 162\*. Leaf scorch of the sugar beet, cherry, cauliflower, and maple. By F. C. Stewart. Nov., 1899.
- 163\*. The New York apple-tree canker. [First report.] By Wendell Paddock. Dec., 1899.
- 164\*. Notes on various plant diseases. By F. C. Stewart. Dec., 1899.
165. Report of analyses of Paris green and other insecticides. By L. L. Van Slyke. Dec., 1899.
- 166\*. Commercial feeding stuffs in New York. By W. H. Jordan and C. G. Jentner. Dec., 1899.
- 167\*. A fruit-disease survey of the Hudson Valley in 1899. By F. C. Stewart and F. H. Blodgett. Dec., 1899.
168. Director's report for 1899. By W. H. Jordan. Dec., 1899.
- 169\*. Fertilizing self-sterile grapes. By S. A. Beach. Dec., 1899.
170. Common diseases and insects injurious to fruits. By S. A. Beach, V. H. Lowe, and F. C. Stewart. Dec., 1899. Also revised edition.

\* Bulletins marked with an asterisk were issued in popular form with the same or modified titles.

- 171\*. Animal food for poultry. By W. P. Wheeler. Dec., 1899.
- 172\*. The efficiency of a continuous pasteurizer at different temperatures. By H. A. Harding and L. A. Rogers. Dec., 1899.
173. Report of analyses of commercial fertilizers for the fall of 1899. By L. L. Van Slyke. Dec., 1899.
174. Fumigation of nursery stock. By S. A. Beach. Mar., 1900.
175. A parasite upon carnation rust. By F. H. Blodgett. Apr., 1900.
176. Inspection of concentrated commercial feeding stuffs during 1900. By W. H. Jordan and C. G. Jentner. Sept., 1900.
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216. Report of analyses of commercial fertilizers for the spring and fall of 1902. By L. L. Van Slyke and W. H. Andrews. Sept., 1902.
217. Inspection of feeding stuffs. By W. H. Jordan, C. G. Jentner, and F. D. Fuller. Nov., 1902.
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230. Some facts about commercial fertilizers in New York State. By L. L. Van Slyke. Feb., 1903.
- 231\*. The relation of carbon dioxide to proteolysis in the ripening of Cheddar cheese. By L. L. Van Slyke and E. B. Hart. Feb., 1903.
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- 234\*. Experiments in curing cheese at different temperatures. By L. L. Van Slyke, G. A. Smith, and E. B. Hart. July, 1903.
- 235\*. Two decays of stored apples. By H. J. Eustace. July, 1903.
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- 237\*. The rôle of the lactic-acid bacteria in the manufacture and in the early stages of ripening of Cheddar cheese. By H. A. Harding. July, 1903.
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- 239\*. Thinning apples. By S. A. Beach. Sept., 1903.
240. Inspection of feeding stuffs. By W. H. Jordan and F. D. Fuller. Sept., 1903.
- 241\*. Potato spraying experiments in 1903. By F. C. Stewart, H. J. Eustace, and F. A. Serrine. Dec., 1903.
- 242\*. The importance of mineral matter and the value of grit for chicks. By W. P. Wheeler. Dec., 1903.
243. Spray mixtures and spray machinery. By S. A. Beach, V. A. Clark, and O. M. Taylor. Dec., 1903.
244. Director's report for 1903. By W. H. Jordan. Dec., 1903.
- 245\*. Chemical changes in the souring of milk and their relations to cottage cheese. By L. L. Van Slyke and E. B. Hart. Feb., 1904.
- 246\*. An experiment in shading strawberries. By O. M. Taylor and V. A. Clark. Feb., 1904.
- 247\*. The lime-sulphur-soda wash for orchard treatment. By P. J. Parrott, S. A. Beach, and H. O. Woodworth. Feb., 1904.
- 248\*. New York apples in storage. By S. A. Beach and V. A. Clark. Mar., 1904.
- 249\*. A swelling of canned peas accompanied by a malodorous decomposition. By H. A. Harding and J. F. Nicholson. Mar., 1904.
250. The nature of the principal phosphorus compound in wheat bran. By A. J. Patten and E. B. Hart. Mar., 1904.
251. Vitality of the cabbage black rot germ on cabbage seed. By H. A. Harding, F. C. Stewart, and M. J. Prucha. Oct., 1904.
252. Report of analyses of commercial fertilizers for the spring and fall of 1903. By W. H. Jordan, L. L. Van Slyke, and W. H. Andrews. May, 1904.
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- 254\*. Fall spraying with sulphur washes. By P. J. Parrott and F. A. Serrine. Aug., 1904.
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256. Seed selection according to specific gravity. By V. A. Clark. Oct., 1904.
- 257\*. The composition of commercial soaps in relation to spraying. By L. L. Van Slyke and F. A. Urner. Dec., 1904.
- 258\*. A study of the chemistry of home-made cider vinegar. By L. L. Van Slyke. Dec., 1904.
- 259\*. The proportion of animal food in the ration for ducklings. By W. P. Wheeler. Dec., 1904.
260. Director's report for 1904. Dec., 1904.
261. Some of the relations of casein and paracasein to bases and acids, and their application to Cheddar cheese. By L. L. Van Slyke and E. B. Hart. Jan., 1905.
- 262\*. Sulphur washes for orchard treatment, II. By P. J. Parrott, S. A. Beach, and F. A. Serrine. Jan., 1905.
- 263\*. The proteids of butter in relation to mottled butter. By L. L. Van Slyke, and E. B. Hart. Mar., 1905.
- 264\*. Potato spraying experiments in 1904. By F. C. Stewart, H. J. Eustace, and F. A. Serrine. Mar., 1905.
265. Plant food constituents used by bearing fruit trees; tabulated analyses showing amounts of plant-food constituents in fruits, vegetables, etc. By L. L. Van Slyke, O. M. Taylor, and W. H. Andrews. Apr., 1905.
266. Report of analyses of samples of fertilizers collected by the commissioner of agriculture during the summer and fall of 1904. Apr., 1905.
- 267\*. Effect of certain arsenites on potato foliage. By W. H. Jordan, F. C. Stewart, and H. J. Eustace. May, 1905.
268. Inspection of feeding stuffs. Sept., 1905.
- 269\*. Winter injury to fruit trees. By H. J. Eustace. Oct., 1905.
- 270\*. The quality of commercial cultures for legumes. By H. A. Harding and M. J. Prucha. Nov., 1905.
- 271\*. The adaptability of concentrated by-products for poultry feeding. By W. P. Wheeler. Dec., 1905.
272. Report of analyses of samples of fertilizers collected by the commissioner of agriculture during 1905. Dec., 1905.
- 273\*. Spraying for San José scale. By H. E. Hodgkiss, F. A. Serrine, and E. L. Baker. Dec., 1905.
274. Director's report for 1905. By W. H. Jordan. Dec., 1905.
275. Apple districts of New York with varieties for each. By U. P. Hedrick, N. O. Booth, and O. M. Taylor. Apr., 1906.
- 276\*. Varieties of strawberries and cultural directions. By O. M. Taylor. Apr., 1906.
- 277\*. The Bang method of controlling tuberculosis, with an illustration of its application. By H. A. Harding, G. A. Smith, and V. A. Moore. Apr., 1906.
- 278\*. Varieties of raspberries and blackberries, with cultural directions. By O. M. Taylor. May, 1906.
- 279\*. Potato spraying experiments in 1906 [i. e. 1905]. By F. C. Stewart, H. J. Eustace, and F. A. Serrine. May, 1906.
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- 286\*. The poplar and willow borer (*Cryptorhynchus lapathi* L.). By W. J. Schoene. Feb., 1907.
- 287\*. Bordeaux injury. By U. P. Hedrick. Mar. 1907.
- 288\*. Ringing herbaceous plants. By U. P. Hedrick, O. M. Taylor, and Richard Wellington. Apr., 1907.
- 289\*. The effect of wood ashes and acid phosphate on the yield and color of apples. By U. P. Hedrick. Apr., 1907.
- 290\*. Potato spraying experiments in 1906. By F. C. Stewart [and others]. June, 1907.
291. Inspection of feeding stuffs. Aug., 1907.
- 292\*. Effect of treating milk with carbon dioxide gas under pressure. By L. L. Van Slyke and A. W. Bosworth. Aug., 1907.
293. Analyses of miscellaneous materials. By L. L. Van Slyke. Oct., 1907.
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- 296\*. Control of scale in all apple orchards. By P. J. Parrott, H. E. Hodgkiss, and W. J. Schoene. Jan., 1908.
- 297\*. Investigations on some fruit diseases. By H. J. Eustace. Feb., 1908.
298. Distribution of station strawberries and raspberries. By U. P. Hedrick and O. M. Taylor. Mar., 1908.
- 299\*. The relation of weather to the setting of fruit; with blooming data for 866 varieties of fruit. By U. P. Hedrick. Mar., 1908.
- 300\*. Inoculation as a factor in growing alfalfa. By H. A. Harding and J. K. Wilson. Mar., 1908.
- 301\*. Screening for the protection of cabbage seed beds. By W. J. Schoene. Mar., 1908.
- 302\*. Dipping of nursery stock in the lime-sulphur wash. By P. J. Parrott, H. E. Hodgkiss, and W. J. Schoene. Apr. 1908.
303. Inspection of feeding stuffs. July, 1907 [i. e. 1908].
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- 305\*. Troubles of alfalfa in New York. By F. C. Stewart, G. T. French and J. K. Wilson. Nov., 1908.
- 305\*. Control of leaf blister mite in apple orchards. By P. J. Parrott. Dec., 1908.
- 307\*. Potato spraying experiments in 1907. By F. C. Stewart, G. T. French, and F. A. Serrine. Dec., 1908.
- 308\*. Methods of paying for milk at cheese factories. By L. L. Van Slyke. Dec., 1908.
- 309\*. Variety test of strawberries and cultural directions. By O. M. Taylor. Dec., 1908.
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- 311\*. Potato spraying experiments in 1908. By F. C. Stewart, G. T. French, and F. A. Serrine. Jan., 1909.
- 312\*. The tussock moth in orchards. By W. J. Schoene. Jan., 1909.
- 313\*. Inoculation and lime as factors in growing alfalfa. By H. A. Harding and J. K. Wilson. Feb., 1909.
- 314\*. A comparison of tillage and sod mowing in an apple orchard. By U. P. Hedrick. Mar., 1909.
315. The grape districts of New York and table of varieties. By M. J. Dorsey. Mar., 1909.
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- 317\*. Milking machines: [I] Effect of method of handling on germ content of the milk. By H. A. Harding, J. K. Wilson, and G. A. Smith. Sept., 1909.
318. Report of analyses of samples of fertilizers collected by the commissioner of agriculture during 1909. [By E. L. Baker and others.] Nov., 1909.
- 319\*. A chemical study of the lime-sulphur wash. By L. L. Van Slyke, C. C. Hedges, and A. W. Bosworth. Dec., 1909.
- 320\*. Concentrated lime-sulfur mixtures. By P. J. Parrott. Dec., 1909.
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- 331\*. Preliminary report on grape insects. By F. Z. Hartzell. Dec., 1910.
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- 336\*. Newer varieties of strawberries, and cultural directions. By O. M. Taylor. Apr., 1911.
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- 396\*. Effect of various dressings on pruning wounds of fruit trees. By G. H. Howe. Feb., 1915.
- 397\*. Lime-sulphur versus Bordeaux mixture as a spray for potatoes, III. By M. T. Munn. Feb., 1915.
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- 399\*. The spindling-sprout disease of potatoes. By F. C. Stewart and F. A. Sistrine. Mar., 1915.
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- 402\*. The status of spraying practices for the control of plant lice in apple orchards. By P. J. Parrott and H. E. Hodgkiss. Apr., 1915.
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- 415\*. Plant lice injurious to apple orchards: I. Studies on control of newly hatched aphides. By P. J. Parrott, H. E. Hodgkiss, and F. H. Lathrop. Feb., 1916.
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- 417\*. Some notes on the breeding of raspberries. By R. D. Anthony. Mar., 1916.
- 418\*. Culture and forcing of Witloof chicory. By J. W. Wellington. Mar., 1916.
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- 422\*. Observations on some degenerate strains of potatoes. By F. C. Stewart. July, 1916.
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- 424\*. Measurements of soil fertility. By W. H. Jordan. Aug., 1916.
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- 429\*. Goat's milk for infant feeding. By W. H. Jordan and G. A. Smith.—Practical study of goat's milk in infant feeding as compared to cow's milk. By D. H. Sherman and H. R. Lohnes. Feb., 1917.
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- 432\*. Vinifera grapes in New York. By R. D. Anthony. Apr., 1917.

- 433\*. Winter injury of grapes. By F. E. Gladwin. Apr., 1917.
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- 436\*. Black heart and the aeration of potatoes in storage. By F. C. Stewart and A. J. Mix. June, 1917.
- 437\*. Neck-rot disease of onions. By M. T. Munn. July, 1917.
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- 439\*. The number of bacteria in milk. By J. D. Brew and W. D. Dotterrer. Nov. 1917.
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- 442\*. The radish maggot. By P. J. Parrott and Hugh Glasgow. Nov., 1917.
- 443\*. The control of bacteria in market milk by direct microscopic examination. By R. S. Breed and J. D. Brew. Dec., 1917.
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449. A nonparasitic malady of the vine. By F. E. Gladwin. Mar., 1918.
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- 459\*. Missing hills in potato fields: Their effect upon the yield. By F. C. Stewart. Mar., 1919.
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462. Seed tests made at the station during 1918. By M. T. Munn. June, 1919.
- 463\*. Notes on New York plant diseases, II. By F. C. Stewart. June, 1919.
464. A test of methods in pruning the Concord grape in the Chautauqua grape belt. By F. E. Gladwin. July, 1919.
- 465\*. An experience in crop production [1896-1913]. By W. H. Jordan and G. W. Churchill. June, 1919.
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- 468\*. Some studies relating to calcium metabolism. By W. P. Wheeler. Dec., 1919.
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- 472\*. Milking machines: The production of high-grade milk with milking machines under farm conditions. By J. W. Bright. Feb., 1920.
- 473\*. Soil studies: The influence of fertilizers upon the productiveness of several types of soils; the influence of fertilizers and plant growth upon soil solubles. By W. H. Jordan. Mar., 1920.
- 474\*. Experiments on the spacing of potato plants. By F. C. Stewart. Apr., 1920.
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- 477\*. A progress report of fertilizer experiments with fruits. By R. C. Collison. June, 1920.
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- 479\*. Studies on the cost of producing grapes. By F. E. Gladwin. Sept., 1920.
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482. A study of the composition of official samples of feeding stuffs and mixtures collected in 1920. By L. L. Van Slyke. Dec., 1920.
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1. A study of the metabolism and physiological effects of certain phosphorus compounds with milch cows [I]. By W. H. Jordan, E. B. Hart, and A. J. Patten. Nov., 1906.
2. An outbreak of the European currant rust (*Cronartium ribicola* Dietr.). By F. C. Stewart. Dec., 1906.
3. The action of dilute acids upon casein when no soluble compounds are formed; the hydrolysis of the sodium salts of casein. By L. L. Van Slyke and D. D. Van Slyke. Dec., 1906.
4. Some of the first chemical changes in cheddar cheese; the acidity of the water-extract of cheddar cheese. By L. L. Van Slyke and A. W. Bosworth. Apr., 1907.
5. Chemical studies of camembert cheese. By A. W. Bosworth. June, 1907.
6. Chloroform as an aid in the study of milk enzymes. By H. A. Harding and L. L. Van Slyke. Dec., 1907.
7. The *Sporotrichum* bud-rot of carnations and the silver top of June grass. By F. C. Stewart and H. E. Hodgkiss. Oct., 1908.
8. The bacterial flora of cheddar cheese. By H. A. Harding and M. J. Prucha. Dec., 1908.
9. A *Mycosphaerella* wilt of melons. By J. G. Grossenbacher. Feb., 1909.
10. A volumetric method for the determination of casein in milk. By L. L. Van Slyke and A. W. Bosworth. Sept., 1909.
11. The bacterial soft rots of certain vegetables: The mutual relationships of the causal organisms. By H. A. Harding and W. J. Morse.—Pectinase, the cytolytic enzyme produced by *Bacillus carotovorus* and certain other soft-rot organisms. By L. R. Jones. Nov., 1909.
12. Crown-rot, arsenical poisoning, and winter-injury. By J. G. Grossenbacher. Dec., 1909.
13. The constancy of certain physiological characters in the classification of bacteria. By H. A. Harding. June, 1910.
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15. Medullary spots: A contribution to the life history of some cambium miners. By J. G. Grossenbacher. Nov., 1910.
16. The acidity of gluten feeds. By W. H. Jordan. Dec., 1910.
17. The apple and pear Membracids. By H. E. Hodgkiss. Dec., 1910.
18. A contribution to the life history, parasitism, and biology of *Botryosphaeria ribis*. By J. G. Grossenbacher and B. M. Duggar. July, 1911.
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24. The apple and cherry ermine moths. By P. J. Parrott and W. J. Schoene. Nov., 1912.
25. The organic phosphoric acid of cottonseed meal. By R. J. Anderson. Dec., 1912.
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27. A study of the udder flora of cows. By H. A. Harding and J. K. Wilson. Mar., 1913.
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29. An efficient electrical incubator. By H. J. Conn and H. A. Harding. Mar., 1913.
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35. Bacteria of frozen soil. By H. J. Conn. July, 1914.
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37. Studies relating to the chemistry of milk and casein: The cause of acidity of fresh milk of cows and a method for determination of acidity. By L. L. Van Slyke and A. W. Bosworth.—The phosphorus content of casein. By A. W. Bosworth and L. L. Van Slyke.—The action of rennin on casein (second paper). By A. W. Bosworth. Dec., 1914.
38. Culture media for use in the plate method of counting soil bacteria. By H. J. Conn. Nov., 1914.
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41. Flbrin. By A. W. Bosworth. Apr., 1915.
42. The tree crickets of New York: Life history and bionomics. By B. B. Fulton. May, 1915.
43. Human milk. By A. W. Bosworth. May, 1915.
44. *Ascochyta clematidina*, the cause of stem-rot and leaf-spot of clematis. By W. O. Gloyer. Aug., 1915.
45. Inheritance of certain characters of grapes. By U. P. Hedrick and R. D. Anthony. Aug., 1915.
46. The casein and salts of goat's milk. By A. W. Bosworth and L. L. Van Slyke. Dec., 1915.
47. Limestones of New York, with reference to their agricultural use. By R. C. Collison and J. F. Barker. Dec., 1915.
48. Chemical changes in the souring of milk. By L. L. Van Slyke and A. W. Bosworth. Jan., 1916.
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51. Are spore-forming bacteria of any significance in soil under normal conditions? By H. J. Conn. Mar., 1916.
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53. The number of colonies allowable on satisfactory agar plates. By R. S. Breed and W. D. Dotterer.—A comparison between agar and gelatin as media for the plate method of counting bacteria. By H. J. Conn and W. D. Dotterer. May, 1916.
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55. Concerning certain aromatic constituents of urine: A study of the non-phenolic volatile oils isolated from the urine of cows, goats, horses, and human beings. By R. J. Anderson. Aug., 1916.
56. The leaf-weevil (*Polydrusus impressifrons* Gyll.). By P. J. Parrott and Hugh Glasgow. Dec., 1916.
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58. Soil flora studies: III. Spore-forming bacteria in soil. By H. J. Conn. Mar., 1917.
59. Soil flora studies: IV. Nonspore-forming bacteria in soil. By H. J. Conn. Mar., 1917.
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61. Facilities for lysimeter and out-door pot culture work at the station. By J. F. Barker. Mar., 1917.
62. Determination of carbonates in limestone and other materials. By J. F. Barker. May, 1917.
63. Inheritance of sex in strawberries. By R. D. Anthony. Sept., 1917.
64. The microscopic study of bacteria and fungi in soil. By H. J. Conn. Jan., 1918.
65. Studies relating to milk: The preparation of pure casein; a method for making electrometric titrations of milk and other solutions containing proteins; free lactic acid in sour milk. By L. L. Van Slyke and J. C. Baker. Dec., 1918.
66. The rosy aphid in relation to abnormal apple structures. By P. J. Parrott, H. E. Hodgkiss, and F. Z. Hartzell. Jan., 1919.
67. Ammonification of manure in soil: What soil organisms take part in the ammonification of manure? By J. W. Bright.—Taxonomic study of two important soil ammonifiers. By H. J. Conn. Apr., 1919.
68. Comparison of methods for computing daily mean temperatures: Effect of discrepancies upon investigations of climatologists and biologists. By F. Z. Hartzell. June, 1919.

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70. Conditions causing variation in the reaction of freshly-drawn milk. By L. L. Van Slyke and J. C. Baker. June, 1919.
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73. The use of the nitrate-reduction test in characterizing bacteria. By H. J. Conn and R. S. Breed. June, 1919.
74. Relation between lactic acid production and bacterial growth in the souring of milk. By J. C. Baker, J. D. Brew and H. J. Conn. Dec., 1919.
75. The accuracy of bacterial counts from milksamples. By R. S. Breed and W. A. Stocking. Jan., 1920.
76. A sexual inheritance in the violet (*Viola odorata*). By R. D. Anthony. Mar., 1920.
77. The leafhopper as a potato pest. By P. J. Parrott and R. D. Olmstead. Mar., 1920.
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80. The reaction of milk in relation to the presence of blood cells and of specific bacterial infections of the udder. By J. C. Baker and R. S. Breed. July, 1920.

## [HORTICULTURAL MONOGRAPHS.]

- The apples of New York. Vol. I-II. By S. A. Beach, N. O. Booth, and O. M. Taylor. 1905.  
 The grapes of New York. By U. P. Hedrick [and others]. 1908.  
 The plums of New York. By U. P. Hedrick [and others]. 1911.  
 The cherries of New York. By U. P. Hedrick [and others]. 1915.  
 The peaches of New York. By U. P. Hedrick [and others]. 1917.  
 Sturtevant's notes on edible plants. Edited by U. P. Hedrick. 1919.

## INDEXES.

Index to first twenty-five annual reports, 1882-1906. (In New York State Sta. Rpt., 1907, Pt. I, p. 355-456.)

## NORTH CAROLINA.

## North Carolina Agricultural Experiment Station, Raleigh.

## BULLETINS.

- The first numbered bulletin of this station is 57. The following chronological list of the more important earlier publications is compiled for the most part from several slightly different lists found in publications of the station. (See Bulletin 87.)
- Analyses and valuation of fertilizers. By A. R. Ledoux. May 7, 1877.  
 Directions for making vinegar. 1878.  
 Analysis and valuation of fertilizers. 1877 and 1878. By A. R. Ledoux. 1878.  
 Same. Republished. 1879.  
 Ville's formula for composting and others furnished by A. R. Ledoux. 1879.  
 The sugar beet in North Carolina. 1878.  
 Silica versus ammonia, results of a comparative soil-test of Popplein's silicated phosphate with Peruvian guano, Merryman's ammoniated dissolved bone, Chapelin's ammoniated superphosphate, Pacific guano, etc. By A. R. Ledoux. Dec. 16, 1878.  
 Report of the director, Jan., 1879. (*In Rept. Comr. Agr. N. C., 1877-78, p. 37-51.*)  
 Analyses and valuations of fertilizers for 1879.  
 Formulæ for composting, 1879.  
 Materials of homemade fertilizers. By C. W. Dabney. (*In Monthly Bul. N. C. Dept. Agr. No. 2, Jan., 1880, p. 4.*)  
 Report to the legislature, Jan., 1881.  
 Analyses of drinking waters. By C. W. Dabney. (*In Monthly Bul. N. C. Dept. Agr., Jan., 1881.*)  
 Value of active ingredients of fertilizers. By C. W. Dabney. (*In Monthly Bul. N. C. Dept. Agr. No. 3, Feb., 1882, p. 4.*)  
 Agricultural chemicals. By C. W. Dabney. (*In Monthly Bul. N. C. Dept. Agr., No. 4, Mar., 1881, p. 2, 3.*)  
 Adulterated chemicals; more about drinking waters; analysis of drinking waters. By C. W. Dabney. (*In Monthly Bul. N. C. Dept. Agr., No. 6, May, 1881, p. 4.*)  
 Analyses and valuations of commercial fertilizers and chemicals, season of 1881. By C. W. Dabney. 1881.  
 Analyses and valuations of fertilizers, Ed. 2, 1881.  
 Those adulterated chemicals. By C. W. Dabney. (*In Monthly Bul. N. C. Dept. Agr., No. 7, July, 1881, p. 3, 4.*)  
 Removal; trade in fertilizers; extension in cotton culture; cost of the ingredients of fertilizers. By C. W. Dabney. (*In Monthly Bul. N. C. Dept. Agr., No. 10, Jan., 1882, p. 3.*)  
 Home-made manures; does high manuring pay upon cotton? (*In Monthly Bul. N. C. Dept. Agr., No. 11, Feb., 1882, p. 2, 3.*)  
 Does cotton exhaust the soil?—Cottonseed [and its uses]. By C. W. Dabney. (*In Monthly Bul. N. C. Dept. Agr., No. 12, Mar., 1882, p. 3, 4.*)  
 Stable manure [saved and composted]; some more feeding stuffs. By C. W. Dabney. (*In Monthly Bul. N. C. Dept. Agr., No. 13, Apr., 1882, p. 2-4.*)  
 Analyses of fertilizers. 1882.  
 Analyses of fertilizers again. Ed. 2. 1882.  
 Home-made manures again; [cotton]. By C. W. Dabney. (*In Monthly Bul. N. C. Dept. Agr., No. 14, June, 1882, p. 2, 3.*)  
 Report of work done for the State board of health, 1881. The treatment of cotton lands on scientific principles; the agricultural experiment station at the State fair. By C. W. Dabney. (*In Monthly Bul. N. C. Dept. Agr., No. 15, Oct., 1882, p. 3, 4.*)  
 Horn, leather and wool waste and fertilizers made from them. 1882.  
 Finely ground phosphates or "floats." 1882.  
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 Rice and its products; food and fodder plants. By C. W. Dabney. (*In Monthly Bul. N. C. Dept. Agr., May, 1883, p. 10-12.*)  
 The soja-bean; waste products of tobacco factories. By C. W. Dabney. (*In Monthly Bul. N. C. Dept. Agr., May, 1883, p. 12.*)  
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- Analyses of fertilizers. (*In Monthly Bul. N. C. Dept. Agr., May, 1883, p. 14-15.*)
- Analyses and valuations of fertilizers to May 1, 1883.
- Cotton-seed products. By C. W. Dabney. (*In Monthly Bul. N. C. Dept. Agr., June, 1883, p. 3-6.*)
- North Carolina resources for commercial fertilizers: Ammoniates; sources of potash. By C. W. Dabney. (*In Monthly Bul. N. C. Dept. Agr., Dec. 1883, p. 3-6.*)
- North Carolina resources for commercial fertilizers: Phosphates. By C. W. Dabney. (*In Monthly Bul. N. C. Dept. Agr., Jan., 1884, p. 8-10.*)
- The trade in fertilizers during 1883.
- The fertilizer trade during 1883. By C. W. Dabney. (*In Monthly Bul. N. C. Dept. Agr., Feb., 1884, p. 2-4.*)
- Progress of the phosphate investigation. By C. W. Dabney. (*In Monthly Bul. N. C. Dept. Agr., Mar., 1884, p. 4-7.*)
- Analyses and valuations of fertilizers made up to May 1, 1884. By C. W. Dabney. [1884?]
- North Carolina phosphates; analyses and comparative valuations of fertilizers. By C. W. Dabney. (*In Monthly Bul. N. C. Dept. Agr., Apr., 1884, p. 4-7.*)
- Phosphatic marls and other marls. By C. W. Dabney. (*In Monthly Bul. N. C. Dept. Agr., May, 1884, p. 2-4.*)
- Chemicals yielding nitrogen chiefly. By C. W. Dabney. (*In Monthly Bul. N. C. Dept. Agr., July, 1884, p. 5-7.*)
- North Carolina phosphates. By C. W. Dabney. 1884.
- Analyses of fertilizers. By C. W. Dabney. Mar. 28, 1885.
- Analyses of fertilizers for 1885.
- Analyses of fertilizers, fall 1885.
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- Fall analyses of fertilizers. [1885.]
- Injurious insects and diseases of stock. 1885
- Special instructions for voluntary observers and displaymen. By W. O. Bailey. 1886.
- What the valuations of fertilizers mean. 1885.
- Formulas for composts. By H. B. Battle. Sept., 1887.
- Home-made fertilizers and composts and the ingredients used in them. May, 1888.
57. Field experiments. By H. B. Battle. June, 1888.
58. Details of field experiments. By H. B. Battle.—Examination of North Carolina drinking waters. By R. G. Grissom.—Meteorological summary for June, 1888. By H. M. Baldwin.—Important announcement. By H. B. Battle. July, 1888.
59. Purity and vitality of seed, with tests of seed sold in North Carolina. By Gerald McCarthy.—Meteorological summary for July-August, 1888. By H. M. Baldwin. Aug.-Sept., 1888.
60. Lucerne, its value as a forage crop. By Gerald McCarthy.—Meteorological summary for September-October, 1888. Oct.-Nov., 1888.
61. Composts: Formulas, analyses, and value. By H. B. Battle. Dec., 1888.
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62. Fertilizer analyses and the fertilizer control, season of 1889. By H. B. Battle. Feb., 1889.
- 62½. Fertilizer analyses and the fertilizer control, season of 1889, second edition. By H. B. Battle. Mar., 1889.
63. Tests of seeds, with special reference to the vitality of old seed. By Gerald McCarthy. Rust on wheat and cotton.—Laboratory notes: Does stable manure in drying lose any of its ammonia? By F. B. Dancy.—Additional analyses of commercial fertilizers.—Pamunkey marl phosphate. By H. B. Battle. June, 1889.
64. Practical stock feeding on scientific principles. By F. B. Dancy. July, 1889. See 90.
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66. Stock feeding as practiced in North Carolina. By F. B. Dancy.—Indian corn. By Gerald McCarthy. Sept., 1889.
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- 67a. Seed tests. By Gerald McCarthy. Oct., 1889.
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- 68b. Meteorological summary for North Carolina, November, 1889. By H. B. Battle and C. F. von Herrmann. Dec., 1889.
- 68c. Meteorological summary for North Carolina, December, 1889. By H. B. Battle and C. F. von Herrmann. Jan., 1890.
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- 69b. Meteorological summary for North Carolina, February, 1890. By H. B. Battle and C. F. von Herrmann. Mar., 1890.
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- 72b. Meteorological summary for North Carolina, June, 1890. By H. B. Battle and C. F. von Herrmann. July, 1890.
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73. The best agricultural grasses. By Gerald McCarthy. Oct., 1890.
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- 73b. Meteorological summary for North Carolina, October and November, 1890. By H. B. Battle and C. F. von Herrmann.—Origin of cold waves. By C. F. von Herrmann. Dec., 1890.
74. Work of the horticultural division, 1890: Tests of garden vegetables; fruits; ornamental planting; the culture of figs. By W. F. Massey. Dec., 1890.
- 74a. Meteorological summary for North Carolina, December, 1890. By H. B. Battle and C. F. von Herrmann. Dec., 1890.

- 74b. Meteorological summary for North Carolina, January, 1891. By H. B. Battle and C. F. von Herrmann. Jan., 1891.
75. Fertilizer analyses and fertilizer control, season of 1891. Mar. 16, 1891.
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- 75c. Meteorological summary for North Carolina, February and March, 1891. By H. B. Battle and C. F. von Herrmann. Apr., 1891.
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77. Value of pea-vine manuring for wheat. By J. R. Chamberlain. May, 1891.
- 77a. Diseases of the horse. By C. B. Michener [and others]. 1890.
- 77b. The injury of foliage by arsenites; a cheap arsenite; combination of arsenites with fungicides. By B. W. Kilgore. July, 1891.
78. Some injurious insects. By Gerald McCarthy. July, 1891.
- 78a. Meteorological summary for North Carolina, April and May, 1891. By H. B. Battle and C. F. von Herrmann. July, 1891.
79. Facts of farmers, a bulletin of information on scientific matters in plain language for unscientific readers. By W. F. Massey. July, 1890.
- 79a. Meteorological summary for North Carolina, June and July, 1891. By H. B. Battle and C. F. von Herrmann. Aug., 1891.
80. Silos and silage. By F. E. Emery. Oct., 1891.
- 80a. Entomological and botanical divisions. Synopsis of published work for popular distribution. By Gerald McCarthy. Oct., 1891.
- 80b. Meteorological summary for North Carolina, August, 1891. By H. B. Battle and C. F. von Herrmann. Sept., 1891.
- 80b. Illustrative exhibit at the Southern Exposition, Raleigh, N. C., October and November, 1891. Oct., 1891.
- 80c. The digestibility of cottonseed hulls; the digestibility of a ration of cottonseed hulls and cottonseed meal; comparison of composition and digestibility of wheat straw and cottonseed hulls; the fertilizing constituents recovered in manure in these experiments. By F. E. Emery and B. W. Kilgore. Oct., 1891.
- 80d. Meteorological summary for North Carolina, September, 1891. By H. B. Battle, C. F. von Herrmann, and Roscoe Nunn. Oct., 1891.
- 80e. Meteorological summary for North Carolina, October, 1891. By H. B. Battle, C. F. von Herrmann, and Roscoe Nunn. Nov., 1891.
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82. Fertilizer analyses and fertilizer control, with all analyses made in spring and fall of 1891. By H. B. Battle. Jan., 1892.
- 82a. Fertilizer analyses for 1892: First biweekly edition. By H. B. Battle. Feb. 13, 1892.
- 82b. Fertilizer analyses for 1892: Second biweekly edition. By H. B. Battle. Feb. 27, 1892.
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- 87a. Meteorological summary for North Carolina, July, 1892. By H. B. Battle, C. F. von Herrmann, and Roscoe Nunn.—Summary of proceedings of American Association of State Weather Services, August, 1892. By R. E. Kerkam. Aug., 1892.
- 87b. Meteorological summary for North Carolina, August, 1892. By H. B. Battle, C. F. von Herrmann, and Roscoe Nunn. Sept., 1892.
- 87c. Meteorological summary for North Carolina, September, 1892. By H. B. Battle, C. F. von Herrmann, and Roscoe Nunn. Oct., 1892.
- 87d. Digestion experiments with pulled fodder, crimson clover hay, cowpea-vine hay, corn silage, soja-bean silage, and cottonseed—raw, roasted, hulls, and meal. By F. E. Emery and B. W. Kilgore. Nov., 1892.
- 87e. Meteorological summary for North Carolina, October, 1892; brief statement of rules for making local weather forecasts. By H. B. Battle, C. F. von Herrmann, and Roscoe Nunn. Nov., 1892.
- 87f. Meteorological summary for North Carolina, November, 1892. By H. B. Battle, C. F. von Herrmann, and Roscoe Nunn. Dec., 1892.
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99. Thread worm of pork (*Trichina spiralis*). By F. P. Williamson. Apr., 1894.
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124. Fertilizer analyses of the fertilizer control including official analyses of spring and fall samples of 1895. By H. B. Battle. Jan., 1896.
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161. Drinking water: City, town, and rural supplies. By A. W. Blair. Jan., 1899.
162. Farming in North Carolina. By W. F. Massey. Mar., 1899.
163. Rational stock feeding. By F. E. Emery and J. M. Johnson. May, 1899. A revision of Bul. 106.
164. The flora of North Carolina from Ranunculaceae to Salviniceae. By C. W. Hyams. May, 1899.
165. Preservatives in canned food offered for sale in North Carolina. By W. A. Withers and H. W. Primrose. June, 1899.
166. Butter: Its composition, artificial imitation, and adulterants; butter adulteration in North Carolina. By W. A. Withers and J. M. Pickel. June, 1899.
167. Poultry experiments during the year 1898-99. By F. E. Emery. June, 1899.
168. Experiments with field and forage crops. By F. E. Emery. June, 1899.
169. Feeding experiments and milk records. By F. E. Emery and J. M. Johnson. June, 1899.
170. Gardening under glass: An experiment in tomato forcing. By W. F. Massey and Alex Rhodes.—The use of glass in gardening for the market. By W. F. Massey. Mar., 1900.
171. Corn culture in North Carolina. By Benjamin Irby. May, 1900.
172. The digestibility of some non-nitrogenous constituents of certain feeding stuffs: the purification of phloroglucinol. By G. S. Fraps. May, 1900.
173. Another warning in regard to compost peddlers. By W. A. Withers. June, 1900.
174. Methods of determining proteid nitrogen in vegetable materials. By G. S. Fraps and J. A. Bizzell. June, 1900.
175. Some new species of the genus *Crataegus* and notes on some dichotomous *Panicums*. By W. W. Ashe. Aug., 1900.
176. The relative values of some nitrogenous fertilizers. By W. A. Withers and G. S. Fraps. Nov., 1900.
177. Edible mushrooms of North Carolina. By C. W. Hyams. Dec., 1900.
178. The nature of pentosoids and their determination. By G. S. Fraps. Mar., 1901.
179. The composition of cottonseed meal. By W. A. Withers and G. S. Fraps. Aug., 1901.
180. The sugar beet in North Carolina. By W. A. Withers. May, 1901.
181. Silk culture. By Gerald McCarthy. May, 1902.
182. The apple: Propagation, planting, pruning, and culture. By W. F. Massey.—Apples in North Carolina: preparing apples for market. By T. K. Bruner.—How to utilize the surplus apple crop; cider vinegar. By Gerald McCarthy. Mar., 1903.
183. Insects and fungus enemies of the apple, pear, and quince, with methods of treatment. By F. L. Stevens and Franklin Sherman, jr. Apr., 1903.
184. The culture and marketing of orchard and garden fruits. By W. F. Massey. Apr., 1903.
185. The black rot of the grape in North Carolina and its treatment. By A. W. Edson. Apr., 1903.
186. Insect and fungous enemies of the peach, plum, cherry, fig, and persimmon. By Franklin Sherman, jr., and F. L. Stevens. July, 1903.
187. Grapes and small fruits. By W. F. Massey. Sept., 1903.
188. The Granville tobacco wilt, a preliminary bulletin. By F. L. Stevens and W. G. Sackett. Sept., 1903.
189. Feeding farm horses and mules. By C. W. Burkett. Dec., 1903.
190. The formation of nitrates in the soil. By W. A. Withers. May, 1905.

191. Egg preservation. By J. S. Jeffrey. June, 1905.  
 192. Farm dairying. By J. C. Kendall. May, 1905.  
 193. Spraying mixtures and machinery; when and how to spray. By F. L. Stevens and R. S. Woglum. Feb., 1906. With supplement.  
 194. Mulberries. By H. H. Hume and F. C. Reimer. June, 1906.  
 195. Farm poultry. June, 1907.  
 196. Some apple diseases. By F. L. Stevens and J. G. Hall. June, 1907.  
 197. Some insect enemies of garden crops. By R. I. Smith. May, 1908.  
 198. Handling and marketing milk and cream. By John Michels. June, 1908.  
 199. Feeding experiments with cows and calves. By John Michels. June, 1908.  
 200. Feeding fermented cottonseed meal to hogs. By R. S. Curtis. Apr., 1909.  
 201. Scuppernong and other muscadine grapes: Origin and importance. By F. C. Reimer. Apr., 1909.  
 202. Manufacture and marketing of cottage cheese, skimmilk-buttermilk, and ice-cream. By John Michel. May, 1909. See 210.  
 203. Corn weevils and other grain insects. By R. I. Smith. May, 1909.  
 204. Some factors involved in successful corn growing. By C. B. Williams. June, 1909.  
 205. Insect enemies of cantaloupes, cucumbers, and related plants. By R. I. Smith. Jan., 1910.  
 206. Insects and fungus diseases of apple and pear. By R. I. Smith and F. L. Stevens. Mar., 1910.  
 207. Hog raising in North Carolina. By R. S. Curtis. Apr., 1910.  
 208. Fig culture in North Carolina. By F. C. Reimer. June, 1910.  
 209. Self-sterility of the scuppernong and other muscadine grapes. By F. C. Reimer and L. R. Detjen. Sept., 1910.  
 210. Improved methods for making cottage and Neufchatel cheese. By John Michels. Sept., 1910. A revision of part of 202.  
 211. Feeding and management of poultry for egg production. By J. S. Jeffrey. Sept., 1910.  
 212. Prevention of oat and wheat smut. By F. L. Stevens. Oct., 1910.  
 213. Feeding experiments with cows and calves. By John Michels. Oct., 1910.  
 214. Two important cantaloupe pests. By R. I. Smith. Mar., 1911.  
 215. Cottonseed meal feeding experiments with mules and horses. By R. S. Curtis. June, 1911.  
 216. Feeding cottonseed meal to draft animals. By R. S. Curtis. June, 1911.  
 217. A serious lettuce disease. Lettuce sclerotinose. By F. L. Stevens. July, 1911.  
 218. Feeding experiments with beef cattle. By R. S. Curtis. July, 1911.  
 219. Feeding and management of beef cattle. By R. S. Curtis. Aug., 1911.  
 220. Care and management of the dairy herd. By J. C. McNutt. Aug., 1911.  
 221. Profitable poultry raising. By J. S. Jeffrey. Dec., 1911.  
 222. Cotton-seed meal and corn silage feeding experiments with beef cattle. By R. S. Curtis. June, 1912.  
 223. Sheep raising. By R. S. Curtis. June, 1912.  
 224. Top-working seedling pecan trees. By W. N. Hutt. Jan., 1914.  
 225. How shall farmers organize? By W. R. Camp. Feb., 1914.  
 226. Report of variety tests of cotton for 1913, and a summary of results for the past eleven years. By R. Y. Winters. Mar., 1914.  
 227. Fertilizer experiments with cotton on Piedmont Cecil sandy loam soil and varieties, culture and fertilization of cotton on Piedmont Cecil sandy loam and red clay soils, [1902-1909]. By C. B. Williams, B. W. Kilgore, and A. R. Russell. Apr., 1914.  
 228. Air-cooled apple storage houses. By W. N. Hutt. Aug., 1914.  
 229. Fertilizer experiments with corn on Piedmont Cecil sandy loam soil and varieties, culture and fertilization of corn on Piedmont Cecil sandy loam, red clay soils [1902-1909]. By C. B. Williams, B. W. Kilgore, and A. R. Russell. Feb., 1915.  
 230. Variety tests of corn for 1914. By G. M. Garren. Mar., 1915.  
 231. Report on variety tests of cotton for 1914. By R. Y. Winters. Apr., 1915.  
 232. Results of variety tests of wheat, oats, and rye. By G. M. Garren. July, 1915.  
 233. Common diseases of poultry. By B. F. Kaupp. Sept., 1915.  
 234. Farm drainage in North Carolina. By H. M. Lynde. Nov., 1915.  
 235. Some further studies of chick mortality; when to feed the baby chick. By B. F. Kaupp. Jan., 1916.  
 236. The prevention and control of erosion in North Carolina, with special reference to terracing. By F. R. Baker. Feb., 1916.  
 237. Tobacco culture in North Carolina. By E. H. Matthewson and E. G. Moss. Apr., 1917.  
 238. Harvesting tobacco by priming or picking the leaves as compared with cutting the stalks. By E. G. Moss. Aug., 1917.  
 239. The tobacco flea beetle. By Z. P. Metcalf and G. W. Underhill. Apr., 1919.  
 240. Composite versus one-day sampling of milk for the Babcock test. By W. H. Eaton. Jan., 1918.  
 241. Soybeans and cowpeas for North Carolina. By V. R. Herman. June, 1919.

## SPECIAL BULLETINS.

- 1-15. See regular bulletins 77a, 80a, 80b, 82a, 82b, 83b, 83c, 83e, 86b, 88b, 88c, 89a, 89c, 90c, and 91b.  
 16-27. Contain only fertilizer control work, 1894-1895.  
 28. Agricultural suggestions to the Waldensians [living in Burke County, N. C.]. By W. F. Massey. May 4, 1895. In English and French.  
 28-47. Contain only fertilizer control work, 1895-1897.  
 [48]. The North Carolina agricultural experiment station. [For distribution at the] annual fair, State Agricultural Society, 1897. By W. A. Withers. 1897.  
 [49]. Sugar beets. By W. A. Withers. Mar., 1898.  
 50. The station and its exhibit: A special bulletin for distribution at the annual fair of the North Carolina Agricultural Society. By W. A. Withers. Oct., 1898.  
 51. Catalogue of herbarium specimens for exchange. By C. W. Hyams. Dec., 1898.  
 52. Cattle quarantine line. By Cooper Curtice. Jan., 1899.  
 53. Food adulteration in North Carolina. By W. A. Withers. Jan., 1899.

## TECHNICAL BULLETINS.

- 1-7. See regular bulletins 67a, 77b, 80c, 87d, 90a, 90b, and 91d.  
 8. A serious lettuce disease (sclerotinose) and a method of control. By F. L. Stevens, J. G. Hall, and G. W. Wilson. Sept., 1911.  
 9. Relation of the mineralogical and chemical composition to the fertilizer requirements of North Carolina soils. By J. K. Plummer. May, 1914.  
 10. Breeding rotundifolia grapes: A study of transmission of character. By F. C. Reimer and L. R. Detjen. May, 1914.  
 11. Self-sterility in dewberries and blackberries. By L. R. Detjen. Oct., 1916.  
 12. Inheritance of sex in *Vitis rotundifolia*: First report. By L. R. Detjen. Jan., 1917.

13. Biological investigation of *Sphenophorus callosus* Oliv. By Z. P. Metcalf. Jan., 1917.
14. Repair of bone in domestic fowl. By B. F. Kaupp. Oct., 1917.
15. A monograph on trembles or milk sickness and white snakeroot. By F. A. Wolf, R. S. Curtis, and B. F. Kaupp. July, 1918.
16. Clover stem rot. By F. A. Wolf and R. O. Cromwell. June, 1919.
17. The limits in hybridization of *Vitis rotundifolia* with related species and genera. By L. R. Detjen. July, 1919.
18. Some F<sub>1</sub> hybrids of *Vitis rotundifolia* with related species and genera. By L. R. Detjen. Aug., 1919.
19. Mineral content of southern poultry feeds and their potential acidity and potential alkalinity. By B. F. Kaupp. Dec., 1920.

## NORTH DAKOTA.

North Dakota Agricultural Experiment Station, Agricultural College.

## BULLETINS.

1. Grain smuts. By H. L. Bolley. Jan., 1891.
2. Small fruits. By C. B. Waldron. Apr., 1891.
3. Diseases of sheep. By T. D. Hinebauch. Oct., 1891. See 28.
4. Potato scab and possibilities of prevention; a disease of beets identical with "Deep scab" of potatoes; hastening the maturity of potatoes. By H. L. Bolley. Dec., 1891.
5. Sugar beets. By E. F. Ladd. Feb., 1892.
6. The mustard family. By C. B. Waldron. June, 1892.
7. Rheumatism in horses. By T. D. Hinebauch. Sept., 1892.
8. Wheat growing and dairying for North Dakota. By E. F. Ladd and W. M. Whalen. Dec., 1892.
9. Conditions affecting the value of wheat for seed; prevention of potato scab. By H. L. Bolley. Mar., 1893.
10. Grain and forage crops. By W. M. Hays. May, 1893.
11. Grain and forage crops. By W. M. Hays. Nov., 1893.
12. Transplanting onions. By C. B. Waldron. Jan., 1894.
13. Rational selection of wheat for seed; typhoid fever. By H. L. Bolley. Apr., 1894.
14. Tuberculosis. [By T. D. Hinebauch.] June, 1894.
15. Chemical composition of foods. By E. F. Ladd. Sept., 1894.
16. Dairy herd record, 1894; pasture *v.* pasture and grain; dehorning. By J. H. Shepperd.—Butter making. By E. E. Kaufman. Dec., 1894.
17. The effect of seed exchange upon the culture of wheat; distribution of weed seeds by winter winds. By H. L. Bolley. Mar., 1895.
18. Some profitable vegetables for North Dakota. By C. B. Waldron. Mar., 1895.
19. Treatment of smut in wheat; treatment of potato scab. By H. L. Bolley. Apr., 1895.
20. Winter rations for horses; grain rations for work horses. By J. H. Shepperd. Sept., 1895.
21. Cleanliness in handling milk; bacteriological considerations. By H. L. Bolley. Dec., 1895.
22. The creamery industry. By E. E. Kaufman. Feb., 1896.
23. Grain and forage crops. By J. H. Shepperd. Mar., 1896.
24. North Dakota soils. By E. F. Ladd. June, 1896.
25. Tree culture. By C. B. Waldron. Sept., 1896.
26. Feeding of millet to horses. By T. D. Hinebauch. Nov., 1896.
27. New studies upon the smut of wheat, oats, and barley, with a résumé of treatment experiments for the last three years. By H. L. Bolley. Mar., 1897.
28. Grain rations for fattening sheep; value of straw in a ration, and the gains made after twelve weeks' feeding. By J. H. Shepperd.—"Diseases of sheep," a reprint of Bulletin 3. By T. D. Hinebauch. June, 1897.
29. A study of methods of cultivation. By J. H. Sheppard and J. A. Jeffrey. Sept., 1897.
30. Preliminary report upon the selection of potatoes for planting. By H. L. Bolley. Dec., 1897.
31. Experiment station notes on miscellaneous subjects. By J. H. Worst. Mar., 1898.
32. Chemical studies. By E. F. Ladd. Apr., 1898.
33. Fattening cattle. By J. H. Shepperd. Aug., 1898.
34. Some destructive insects. By C. B. Waldron. Dec., 1898.
35. Some chemical problems investigated. By E. F. Ladd. Jan., 1899. See 44.
36. A study of the root systems of wheat, oats, flax, corn, potatoes, and sugar beets, and of the soil in which they grew. By A. M. Ten Eyck. Jan., 1899.
37. The prevention of the smuts of cereal grains, and prevention of potato scab. By H. L. Bolley. Mar., 1899.
38. Cultivation experiment with wheat and a special study of the moisture and temperature of the soil under the Campbell and ordinary treatments. By J. H. Shepperd and A. M. Ten Eyck. Apr., 1899.
39. Crop report for 1898. By J. H. Shepperd and A. M. Ten Eyck. Apr., 1899.
40. Grass and forage crops. By J. H. Shepperd. Apr., 1899.
41. Some hints on ornamental planting. By C. B. Waldron.—[Locating shrubs for effect. By F. H. Nutter.] Sept., 1899.
42. Field notes of horticultural department. By C. B. Waldron. Dec., 1899.
43. A study of the root systems of cultivated plants grown as farm crops. By A. M. Ten Eyck. Mar., 1900.
44. Water-hemlock poisoning; preserving eggs. By E. F. Ladd. June, 1900. Revised extracts from 35.
45. Feeding trials with work horses. By J. H. Shepperd. Sept., 1900.
46. A preliminary list of the Spermatophyta, seed-bearing plants of North Dakota. By H. L. Bolley and L. R. Waldron. Dec., 1900.
47. Humus and soil nitrogen; climatic studies with wheat, oats, and corn; brome and timothy compared; Austrian brome hay. By E. F. Ladd. Mar., 1901.
48. Wheat farming experiments and soil moisture studies. By J. H. Shepperd and A. M. Ten Eyck. June, 1901.
49. Some points on fruit culture. By C. B. Waldron. Sept., 1901.
50. Flax wilt and flax-sick soil. By H. L. Bolley. Dec., 1901.
51. Corn culture. By J. H. Shepperd and A. M. Ten Eyck. Mar., 1902.
52. The length of the growing season in North Dakota. By E. F. Ladd, J. H. Shepperd, and A. M. Ten Eyck. June, 1902.
53. Food products and their adulteration. By E. F. Ladd. Sept., 1902.
54. Abortion in cattle; scours in new-born calves. By Leunis Van Es. Dec., 1902.
55. Flax and flax-seed selection. By H. L. Bolley. Mar., 1903.

56. Noxious weeds and how to kill them. By L. R. Waldron. June, 1903.
57. Some food products and food adulteration. By E. F. Ladd. Sept., 1903.
58. Some stock-poisoning plants of North Dakota. By Leunis Van Es and L. R. Waldron. Dec., 1903.
59. Trees and fruit in North Dakota. By C. B. Waldron. Mar., 1904.
60. Analysis of formaldehyde sold in North Dakota. By E. F. Ladd. Apr., 1904.
61. Scabies in sheep and cattle and mange in horses. By Leunis Van Es. May, 1904.
62. Weed studies. By L. R. Waldron. Nov., 1904.
63. Adulterated food products and food studies. By E. F. Ladd. Nov., 1904.
64. Root systems of field crops. By J. H. Shepperd. Mar., 1905.
65. Experiments in clover growing; trials with alfalfa. By J. H. Shepperd. Apr., 1905.
66. Waters of North Dakota. By E. F. Ladd. Aug., 1905.
67. Paints and paint products. By E. F. Ladd and C. D. Holley. Dec., 1905.
68. Rust problems: Facts, observations, and theories; possible means of control. By H. L. Bolley. Feb., 1906.
69. Foods and food products; whisky and other beverages; drugs and medicines. By E. F. Ladd. June, 1906.
70. Paints and their compositions. By E. F. Ladd and C. D. Holley. June, 1906.
71. Flax culture. By H. L. Bolley. Oct., 1906.
72. Bleaching of flour. By E. F. Ladd and R. E. Stallings. Nov., 1906.
73. Fattening steers on barley and rejected wheat. By J. H. Shepperd and W. B. Richards. Dec., 1906.
74. Hints to homesteaders. By L. R. Waldron. Jan., 1907.
75. Cereal crop experiments. By J. H. Shepperd and O. O. Churchill. Feb., 1907.
76. Experiments with Indian corn, forage crops, leguminous crops. By J. H. Shepperd and O. O. Churchill. Mar., 1907.
77. Bovine tuberculosis. By Leunis Van Es. July, 1907.
78. Poultry experiments, care and management of the flock. By J. H. Shepperd and O. W. Dynes. Oct., 1907.
79. The distribution of pedigree seed. By J. H. Shepperd and O. O. Churchill. Feb., 1908.
80. Weeds and methods of eradication; weed control by means of chemical sprays. By H. L. Bolley. Mar., 1908.
81. Practical paint tests in 1907. By E. F. Ladd. Sept., 1908.
82. Milling and baking tests; tests of flour sold in North Dakota. By E. F. Ladd. Oct., 1908.
83. Pork production under North Dakota conditions. By W. B. Richards. Nov., 1908.
84. Fattening hogs. By J. H. Shepperd and W. B. Richards. June, 1909.
85. Glanders. By Leunis Van Es. Sept., 1909.
86. Some ready-mixed paints. By E. P. Ladd and G. A. Abbott. Dec., 1909.
87. Seed disinfection and crop production, methods and types of machinery needed. By H. L. Bolley. Jan., 1910.
88. Windbreaks and hedges. By C. B. Waldron. June, 1910.
89. Wheat investigations: Milling, baking and chemical tests. By E. F. Ladd and C. H. Bailey. Sept., 1910.
90. The potato and its culture. By J. H. Shepperd and O. O. Churchill. Jan., 1911.
91. Dairy herd records. By J. H. Shepperd and W. B. Richards. 1911.
92. Paints: Their service condition. By E. F. Ladd and E. E. Ware. June, 1911.
93. Wheat investigations: Milling, baking and chemical tests. By E. F. Ladd and C. H. Bailey. June, 1911.
94. Swamp fever in horses. By Leunis Van Es, E. D. Harris, and A. F. Schalk. Sept., 1911.
95. Alfalfa: I, Practical information for alfalfa growers; II, studies in drought resistance and seed production. By L. R. Waldron. Dec., 1911.
96. Some principles of dry farming. By L. R. Waldron. Jan., 1912.
97. Barn plans. By R. M. Dolve. May, 1912.
98. The silo and its construction. By J. H. Shepperd, G. L. Martin, and R. M. Dolve. July, 1912.
99. The adjustment and repair of self-binders. By R. M. Dolve. July, 1912.
100. Cropping systems for wheat production. By J. H. Shepperd and R. C. Doneghue. Oct., 1912.
101. Potato warehouse plans. By R. M. Dolve. Nov., 1912.
102. Organizing cow-testing associations and cooperative creameries. By G. L. Martin. Nov., 1912.
103. Cropping to flux on new lands of semi-arid areas. By H. L. Bolley and W. L. Wilson. Mar., 1913. Published also as Mont. Agr. Expt. Sta. Circ. 22.
104. Cost of producing farm crops. By W. R. Porter. Apr., 1913.
105. Windmill electric lighting and power. By Wallace Manikowske. Aug., 1913.
106. 1, The fertility constituents of flax. By J. W. Ince.—2, The feeding value of flax material. By J. W. Ince.—3, The distribution of prussic acid in the flax plant. By J. W. Ince.—4, Influence of bran extract on the baking quality of flours. By H. L. White.—5, Phosphorous content of wheat and flour and its relation to the baking qualities of flour. By H. L. White and R. F. Beard. Oct., 1913.
107. Wheat: Soil troubles and seed deterioration causes of soil sickness in wheat lands; possible methods of control; cropping methods with wheat. By H. L. Bolley. Dec., 1913.
108. Avian tuberculosis. By Leunis Van Es and A. F. Schalk. Apr., 1914.
109. Report of four years' work of the North Dakota Holstein cattle breeding circuit. By J. H. Shepperd and W. B. Richards. Dec., 1914.
110. Dry farming investigations in western North Dakota. By J. C. Thysell [and others]. Feb., 1915.
111. Tomatoes for North Dakota. By H. O. Werner. Mar., 1915.
112. Fertility and weeds. By J. W. Ince. May, 1915.
113. Report of progress in sugar beet trials for the season of 1914. By J. W. Ince. May, 1915.
114. Chemical and physical constants for wheat and mill products. By E. F. Ladd. Jan., 1916.
115. Sheep feeding trials at Williston substation. By W. H. Peters and C. H. Ruzicka. Feb., 1916.
116. The influence of energy material upon the relation of soil micro-organisms to soluble plant food. By C. J. T. Dorvland. May, 1916.
117. Composition of the maize plant. By J. W. Ince. July, 1916.
118. Soya bean oil; flax studies. By W. F. Washburn. Sept., 1916.
119. North Dakota wheat for 1916. By E. F. Ladd. Nov., 1916.
120. The capacity of wheat and mill products for moisture. By W. L. Stockham. Jan., 1917.
121. Soil survey of Dickey County. By T. M. Bushnell [and others]. Jan., 1917.
122. The milling and baking data for the 1915 crop of wheat. By Thomas Sanderson. June, 1917.
123. Other grains than wheat in bread making. By W. L. Stockham.—Milling value of barley. By Thomas Sanderson. Oct., 1917.
124. Soil survey of Bottineau County. By R. C. Doneghue. Oct., 1917.
125. Notes on parasitic anaphylaxis and allergy. By Leunis Van Es and A. F. Schalk. Oct., 1917.

126. Crop rotation and soil fertility. By R. C. Doneghue. May, 1918.
127. Pork production in North Dakota. By W. H. Peters and D. J. Geiken. July, 1918.
128. New labor saving machinery for harvesting grain. By W. R. Porter. Apr., 1919.
129. Potato experiments 1917 and 1918. By H. O. Werner. May, 1919.
130. Report of the Hettinger substation for the years 1913-1918, inclusive. [By J. H. Shepperd and others.] May, 1919.
131. Report [7-11] of the Dickinson substation for the years 1914-1918, inclusive. [By J. H. Shepperd and others.] Oct., 1919.
132. Not published.
133. Not published.
134. Report of the Langdon substation, 1914 to 1919. By P. F. Trowbridge. Sept., 1920.
135. Thirteenth and fourteenth annual report of the State demonstration farms 1918 and 1919. By W. R. Porter. May, 1920.
136. Report of the director, July 1, 1917 to June 30, 1919. By P. E., Trowbridge. Mar., 1920.
137. The bread value of wheat. By Thomas Sanderson. May, 1920.
138. Twelfth annual report of the Dickinson substation, 1919. By Leroy Moomaw. July, 1920.
139. Some factors related to the quality of wheat and strength of flour. By W. L. Stockham. Sept., 1920.
140. Grass fat cattle warmed up on corn fodder with a straw shed as shelter. By J. H. Shepperd. Sept., 1920.
141. Fall plowing vs. spring plowing for North Dakota grain crops. By H. L. Walster. Sept., 1920.
142. The cost of producing wheat and other crops in North Dakota in 1919. By R. E. Willard. Sept., 1920.
143. Earliness and rustiness of spring wheats. By H. L. Walster. Dec., 1920.

## PAINT BULLETINS.

1. Report on service condition of paints. By H. A. Gardner, George Butler, and Charles Macnichol. Feb., 1910.
  2. Report on the service condition of paints. By John Theobald and R. L. Peters. Feb., 1910.
  3. Report on the service condition of paints. By S. M. Evans, R. W. Evans, and L. S. Hughes. Feb., 1910.
  4. Report on service condition of paints. By John Dewar. Apr., 1910.
- Vol. I, No. 5. Analysis of mixed paints. Apr., 1911.
- Vol. I, No. 6. Lessons from the 1906 test fence. By E. F. Ladd and W. F. Washburn.—The North Dakota paint law and its workings. By E. F. Ladd.—Analyses of commercial paints. By E. F. Ladd and W. F. Washburn.—Method for varnish analysis. By R. W. Darner. Mar., 1915.
- Vol. I, No. 7. A study of the fatty acids obtained from varnish oils and varnishes. By W. T. Pearce.—The wearing quality and physical tests of several exterior varnishes compared with their chemical analysis. By W. T. Pearce and E. V. Ladd.—Soya bean investigation. By Culver Ladd. Oct., 1919.

## SPECIAL BULLETINS.

1. Rocky mountain locusts. By H. E. Stockbridge. July, 1891.
2. Weeds. By L. R. Waldron. May, 1903.

## SPECIAL BULLETINS, FOOD DEPARTMENT.

Individual numbers of this series often have no distinctive title, but are made up of items relating to food and drug inspection. Reports of work of more than routine interest are brought out in the following list.

1. Pure food law and rulings of the food commissioner. By E. F. Ladd. Apr., 1902.
  2. A warning regarding the use of chemical preservatives in meats. By E. F. Ladd. Mar., 1905.
  3. Pure food, pure drug, formaldehyde, Paris green and paint laws. By E. F. Ladd. Apr., 1905.
  4. Pure food law amended and reenacted; pure drug law; paint law; rulings and discussions. By E. F. Ladd. Apr., 1906.
  5. Agricultural laws. By E. F. Ladd. Apr., 1907.
  6. Food and drug laws. By E. F. Ladd. Apr., 1907. Revised reprint, May, 1915.
  7. Labels and rulings. By E. F. Ladd. Nov., 1907.
  8. Labels and rulings. By E. F. Ladd. Oct., 1908.
  9. Chemically treated flours. By E. F. Ladd. Dec., 1908.
  10. Model food law bill. By E. F. Ladd. Dec., 1908.
  11. Pure beverage law; sanitary inspection law; rulings and discussions. By E. F. Ladd. May, 1909. Revised reprint, Dec., 1911.
- Vol. I, No. 12. [Miscellaneous items.] June, 1909.
- Vol. I, No. 13. [Miscellaneous items.] July, 1909.
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- Vol. I, No. 28. [Miscellaneous items including:] Quantitative determination of water in pastes, semi-pastes, and mixed paints. By L. P. Nemzek. Dec., 1910.
- Vol. I, No. 29. [Miscellaneous items.] Jan., 1911.
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 Vol. VI, No. 2. [Miscellaneous items including:] Cost of handling fruit. By F. C. Himber. Oct., 1920.  
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## OHIO.

## Ohio Agricultural Experiment Station, Wooster.

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2. Test of varieties of wheat, with tables and explanatory notes. By W. R. Lazenby. 1884.
- 3.
4. Descriptive notes of varieties of winter wheat tested the past season. By W. R. Lazenby. 1884.
- 5.
6. Wheat, thick and thin seeding. By W. R. Lazenby. 1884.
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9. Notes on different varieties of grasses. By W. R. Lazenby. 1884.
10. Notes on strawberries. By W. R. Lazenby. 1884.
11. Varieties of oats. By W. R. Lazenby. [1885?]
12. Varieties of corn. By W. R. Lazenby. [1885?]
13. Testing butter. By H. A. Weber. Mar., 1886.

<sup>14</sup> Bulletins of this series were issued for newspaper use and were afterward incorporated in the first six annual reports.

14. Varieties of potatoes, sweet corn, and cabbage. By W. B. Alwood and W. J. Green. [1885?
- 15.
16. Tests of varieties of wheat. [1886?]
17. Wheat experiments: Early and late seeding. By W. S. Devo. Aug., 1886.
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19. Experiments with oats. By W. S. Devo. Sept., 1886.
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21. Experiments with pig feeding. By W. S. Devo. Dec., 1886.
22. Experiments with fertilizers on potatoes. By W. J. Green. Jan., 1887.

## BULLETINS, SECOND SERIES.

1. History, organization, and work of station. By C. E. Thorne. Apr., 1888.
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4. Experiments in preventing curculio injury to cherries; the chinch bug in Ohio—midsummer remedies. By C. M. Weed. July, 1888.
5. Small fruits. By W. J. Green. Aug., 1888.
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8. (Vol. II, No. 1.) Practical remedies for some Ohio insects; insecticides and their application; methods of collecting, preserving, and studying insects. By C. M. Weed. Mar., 1889.
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- [27.] (Vol. IV, No. 1.) Experiments with corn. By J. F. Hickman and C. E. Thorne. Jan., 1891.
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- [29.] (Vol. IV, No. 3.) Commercial and other fertilizers on wheat. By C. E. Thorne and J. F. Hickman. Aug., 1891.
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- [37.] (Vol. V, No. 1.) Oats. By J. F. Hickman. Jan., 1892.
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- [39.] (Vol. V, No. 3.) Field experiments with commercial fertilizers. By C. E. Thorne and J. F. Hickman. Mar., 1892.
- [40.] (Vol. V, No. 4.) Insects which burrow in the stems of wheat. [By F. M. Webster.] Apr., 1892.
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42. Field experiments with wheat. By J. F. Hickman. Aug., 1892.
43. Greenhouses and greenhouse work. By W. J. Green.—Tomatoes as a greenhouse crop. By E. C. Green.—Lettuce as a greenhouse crop. By W. S. Turner.—The food of the robin. By E. V. Wilcox and F. M. Webster. Sept., 1892.
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46. Underground insect destroyers of the wheat plant. By F. M. Webster. Dec., 1892.
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51. Miscellaneous entomological papers. By F. M. Webster. Dec., 1893.
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53. Field experiments with commercial fertilizers. By C. E. Thorne and J. F. Hickman. Mar., 1894.
54. Strawberries; cultural notes; comparison of varieties. By W. J. Green and E. C. Green. Oct., 1894.
55. The Russian thistle in Ohio, and weeds in general. By A. D. Selby.—Ohio laws relative to weeds, black knot, and yellows. Oct., 1894. See 83.
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60. Feeding for beef. By C. E. Thorne and J. F. Hickman. Aug., 1895.
61. Subirrigation in the greenhouse. By W. J. Green and E. C. Green. Sept., 1895.
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65. Potatoes: Comparison of varieties, experiments with fertilizers. By W. J. Green and H. O. McFadden. Dec., 1895.
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69. The chinch bug. By F. M. Webster. Mar., 1896.
70. Forage crops. By J. F. Hickman. Apr., 1896.
71. The maintenance of fertility: Field experiments with fertilizers; the sources and cost of fertilizing materials; the home mixing of fertilizers. By C. E. Thorne, J. F. Hickman, and W. J. Green.—A fertilizer with misleading name. By A. D. Selby. Apr., 1896.
72. Peach yellows and black knot. By A. D. Selby.—San José scale. By F. M. Webster. Aug., 1896.
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83. A first Ohio weed manual. By A. D. Selby. Sept., 1897. Supersedes 55 and 59. See 175.
84. Sixteenth annual report for [Jan.-June], 1897. C. E. Thorne [and others]. July, 1897.
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88. Cooperative experiments made by the Ohio Agricultural Students' Union in 1896. By L. M. Bloomfield and J. S. Hine. Dec., 1897.
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98. Small fruits: Cultural notes and comparison of varieties. By W. J. Green. Jan., 1899.
99. Sugar-beet investigations in 1898. By A. D. Selby. Jan., 1899.
100. The home mixing of fertilizers. By C. E. Thorne. Feb., 1899.
101. Oats. By J. F. Hickman. Mar., 1899.
102. Seed and soil treatment and spray calendar for insect pests and plant diseases. By W. J. Green, A. D. Selby, and F. M. Webster. Mar., 1899. A revision of 79. See 147.
103. The San José scale problem in Ohio in 1898. By F. M. Webster. Mar., 1899.
104. Further studies upon spraying peach trees and upon diseases of the peach. By A. D. Selby. Mar., 1899.
105. Further studies of cucumber, melon, and tomato diseases. By A. D. Selby. Apr., 1899.
106. The chinch bug; experiments with insecticides. By F. M. Webster. Apr., 1899.
107. The Hessian fly. By F. M. Webster. May, 1899.
108. Bovine tuberculosis. By C. E. Thorne. Jan., 1899.
109. Meteorological summary for 1898. By C. A. Patton.—Eighteenth annual report for 1898-99. By C. E. Thorne [and others]. July, 1899.
110. The maintenance of fertility: Field experiments with fertilizers, 1888-1899. By C. E. Thorne. Dec., 1899.
111. Investigations of plant diseases. By A. D. Selby. Dec., 1899.

112. The clover root borer. By F. M. Webster. Dec., 1899.
113. Plums: A comparison of varieties. By W. J. Green. Dec., 1899.
114. How insects are studied at the Ohio Agricultural Experiment Station. By F. M. Webster. Jan., 1900.
115. Sugar beets and sorghum: Investigations in 1899. By A. D. Selby. Jan., 1900.
116. The grape-cane gall maker and its enemies. By F. M. Webster. Feb., 1900.
117. Stomach worms in sheep. By J. F. Hickman. Apr., 1900.
118. Field experiments with wheat. By J. F. Hickman. June, 1900.
119. The Hessian fly in 1899 and 1900. By F. M. Webster. June, 1900.
120. Meteorological summary for 1899. By C. A. Patton.—Press bulletins [194-211].—Nineteenth annual report for 1899-1900. By C. E. Thorne [and others]. July, 1900.
121. A condensed handbook of the diseases of cultivated plants in Ohio. By A. D. Selby. Sept., 1900. See 214.
122. Onion smut: Preliminary experiments. By A. D. Selby. Dec., 1900.
123. Grape rots in Ohio. By A. D. Selby.—Experiments in the prevention of grape rot. By A. D. Selby and J. F. Hicks. Jan., 1901.
124. The maintenance of fertility: Field experiments with fertilizers on corn, oats, and wheat in 1899 and 1900. By C. E. Thorne. Mar., 1901.
125. The maintenance of fertility: Field experiments with fertilizers on potatoes, 1894 to 1900. By C. E. Thorne. Mar., 1901.
126. Sugar beet investigations in Ohio in 1900. By A. D. Selby and J. W. Ames. Mar., 1901.
127. Miscellaneous chemical analyses of feeds, foods, grains, fruits, insecticides, fertilizing materials, limestones and mineral waters, 1892-1901. By A. D. Selby and J. W. Ames. June, 1901.
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130. Spraying for grape rot. By A. D. Selby and J. F. Hicks.—The relation of grape spraying to public health. By A. D. Selby. Jan., 1902.
131. The prevention of onion smut. By A. D. Selby. Jan., 1902.
132. Sugar-beet investigations in 1901. By J. W. Ames. Jan., 1902.
133. Potatoes. By W. J. Green and C. W. Waid. Mar., 1902.
134. The value of barnyard manure. By C. E. Thorne and J. F. Hickman. May, 1902. Revised edition. May, 1904.
135. Meteorological summary for 1901. By C. A. Patton.—Press bulletins [225-239].—Twenty-first annual report for 1901-1902. By C. E. Thorne [and others]. June, 1902.
136. The Hessian fly in Ohio. By C. E. Thorne. Dec., 1902.
137. Suggestions concerning apple culture. By W. J. Green. Feb., 1903.
138. Experiments with oats. By C. G. Williams. Mar., 1903.
139. A rosette disease of potatoes. By A. D. Selby. Apr., 1903.
140. The corn crop. By C. G. Williams. Apr., 1903.
141. The maintenance of fertility: Field experiments with fertilizers on cereal crops; lime and clover; the home mixing of fertilizers. By C. E. Thorne. June, 1903.
142. Clover and alfalfa seeds. By A. D. Selby and J. F. Hicks. June, 1903.
143. Twenty-second annual report for 1902-3. By C. E. Thorne [and others].—Meteorological summary for 1902. By C. A. Patton.—Press bulletins [240-250]. June, 1903.
144. Experiments with sulphur sprays for the fall treatment of the San José scale. By P. J. Parrott and J. S. Houser. Oct., 1903.
145. Studies in potato rosette, II. By A. D. Selby. Nov., 1903.
146. Varieties of strawberries and raspberries. By W. J. Green and C. W. Waid. Dec., 1903.
147. Seed and soil treatment and spray calendar for insect pests and plant diseases. By W. J. Green and A. D. Selby. Jan., 1904. Revision of 102. See 199.
148. Peach diseases, III. By A. D. Selby. Feb., 1904.
149. The hardy catalpa as a farm crop. By W. J. Green. Mar., 1904.
150. Ohio soil studies: I, Chemical and mechanical analyses of the soils under experiment; types represented; discussion of results. By A. D. Selby and J. W. Ames. May, 1904.
151. Proceedings of the second annual reunion of the Ohio State Board of Agriculture, the College of Agriculture, Ohio State University, the farmers' institute lecturers of Ohio, and the Ohio Agricultural Experiment Station. June, 1904.
152. Twenty-third annual report for 1903-4. By C. E. Thorne [and others].—Meteorological summary for 1903. By C. A. Patton.—Press bulletins [251-260]. June, 1904.
153. Forcing tomatoes. By W. J. Green and C. W. Waid. Aug., 1904.
154. Varieties of strawberries. By W. J. Green and F. H. Ballou. Sept., 1904.
155. Silage vs. grain for dairy cows. By C. G. Williams. Oct., 1904.
156. Tobacco diseases; tobacco breeding. By A. D. Selby. Nov., 1904.
157. Winterkilling of peach trees. By W. J. Green and F. H. Ballou. Dec., 1904.
158. Forestry investigations, I. By W. J. Green and C. W. Waid. Jan., 1905.
159. The maintenance of fertility: Liming the soil. By C. E. Thorne. Mar., 1905.
160. The codling moth. By W. J. Green and J. S. Houser. Apr., 1905.
161. Experiments with fertilizers on tobacco. By C. E. Thorne. Apr., 1905.
162. Plums for home and market. By W. J. Green and F. H. Ballou. May, 1905.
163. Twenty-fourth annual report for 1904-1905. By C. E. Thorne [and others].—Meteorological summary for 1904. By C. A. Patton.—Press bulletins [261-265]. June, 1905.
164. Winter practice in economic zoology. By H. A. Gossard. July, 1905.
165. Experiments with winter wheat. By C. G. Williams. Aug., 1905.
166. The newer strawberries. By W. J. Green and F. H. Ballou. Sept., 1905.
167. The maintenance of fertility: Fertility studies on Wooster soil. By A. H. Snyder and C. L. Cook. Oct., 1905.
168. The maintenance of fertility: Fertility studies on Strongsville soil. By A. H. Snyder and C. L. Cook. Dec., 1905.
169. Spraying for the San José scale. By J. S. Houser. Jan., 1906.
170. Peaches for home and market. By W. J. Green and F. H. Ballou. Feb., 1906.
171. Orchard culture. A comparison of different methods as applied in the care of the apple orchard. By W. J. Green and F. H. Ballou. Mar., 1906.
172. Experiments with fertilizers on tobacco. By C. E. Thorne. Mar., 1906.
173. Blighting of field and garden peas, chiefly due to seed infection; powdery mildew of the pea. By J. M. Van Hook. Apr., 1906.
174. Potato investigations: Variety tests; spraying and seed selection experiments. By W. J. Green and C. W. Waid. Apr., 1906.
175. A second Ohio weed manual. By A. D. Selby. May, 1906. A revision of 83.

176. Twenty-fifth annual report for 1905-6. By C. E. Thorne [and others]. Meteorological summary for 1905. By C. A. Patton.—Press bulletins [266-275]. June, 1906.
177. The Hessian fly. By H. A. Gossard and J. S. Houser. Aug., 1906.
178. The strawberry test plot. By F. H. Ballou. Sept., 1906.
179. Fattening range lambs. By B. E. Carmichael. Dec., 1906.
180. Renewal of old orchards. By F. H. Ballou. Feb., 1907.
181. Alfalfa in Ohio. By C. G. Williams and C. H. Kyle. Apr., 1907.
182. The maintenance of fertility: Field experiments with fertilizers on cereal crops and potatoes; summary of results for 13 years, 1894-1906, inclusive. By C. E. Thorne. May, 1907.
183. The maintenance of fertility: The production of manure; and the reinforcement of manure; the value of manure. [By C. E. Thorne]. June, 1907.
184. The maintenance of fertility: Statistics of production in field experiments with fertilizers and manures from 1894 to 1905, inclusive. Appendix to bulletins 182 and 183. [By C. E. Thorne.] June, 1907.
185. Twenty-sixth annual report for 1906-7. By C. E. Thorne [and others].—Meteorological summary for 1906. By C. A. Patton.—Press bulletins [276-285]. July, 1907.
186. Strawberries: The newer varieties. By F. H. Ballou. Aug., 1907.
187. Fattening range lambs. By B. E. Carmichael. Nov., 1907.
188. First report on forest conditions in Ohio. By C. E. Thorne and W. J. Green. Dec., 1907.
189. Forestry suggestions. By W. J. Green and Edmund Secrest. Jan., 1908.
190. Evergreens, their uses and culture. By W. J. Green and W. E. Bontrager. Feb., 1908.
191. Spraying apples. By H. A. Gossard. Feb., 1908.
192. Fall and early winter injuries to orchard trees and shrubbery by freezing. By A. D. Selby. Feb., 1908.
193. Silage for fattening cattle. By B. E. Carmichael. May, 1908.
194. The more important insects affecting Ohio shade trees. By J. S. Houser. June, 1908. See 332.
195. Feeding work horses. By B. E. Carmichael. June, 1908.
196. Twenty-seventh annual report for 1907-8. By C. E. Thorne [and others].—Meteorological summary for 1907. By C. A. Patton.—Press bulletins [286-292]. July, 1908.
197. The catalpa midge. By H. A. Gossard. Oct., 1908.
198. Spring manual of practice in economic zoology. By H. A. Gossard. Nov., 1908.
199. Spray calendar with seed and soil treatment methods. By W. J. Green, A. D. Selby, and H. A. Gossard. Dec., 1908. A revision of 147. See 232.
200. Second annual report on forest conditions in Ohio. [By C. E. Thorne] and W. J. Green. Dec., 1908.
201. The mineral elements in animal nutrition. By E. B. Forbes. Jan., 1909. A corrected edition was issued to replace copies first distributed.
202. The raspberry *Byturus* (*Byturus unicolor*). By W. H. Goodwin. Feb., 1909.
203. Studies in diseases of cereals and grasses. By A. D. Selby and T. F. Manns. April, 1909.
204. Forest conditions in Ohio. By W. J. Green and Edmund Secrest. June, 1909.
205. Twenty-eighth annual report for 1908-1909. By C. E. Thorne [and others].—Meteorological summary for 1908. By C. A. Patton.—Press bulletins [293-303]. July, 1909.
206. The maintenance of fertility: Field experiments with fertilizers and manures on tobacco, corn, wheat, and clover in the Miami Valley. Aug., 1909.
207. The balance between inorganic acids and bases in animal nutrition. By E. B. Forbes. Aug., 1909.
208. Protection of fruit trees from rodents. By F. H. Ballou. Aug., 1909.
209. Rations for fattening swine. By B. E. Carmichael. Aug., 1909.
210. The blight of oats, a bacterial disease. By T. F. Manns. Oct., 1909.
211. Third annual report on forest conditions in Ohio. By C. E. Thorne, W. J. Green, and Edmund Secrest. Nov., 1909.
212. Corn judging: Studies of prominent ear characters in their relation to yield. By C. G. Williams and F. A. Welton. Dec., 1909.
213. Specific effects of rations on the development of swine. By E. B. Forbes. Dec., 1909.
214. A brief handbook of the diseases of cultivated plants in Ohio. By A. D. Selby. Mar., 1910. A revision of 121.
215. Methods for the quantitative estimation of inorganic phosphorus in vegetable and animal substances. By E. B. Forbes, A. Lehmann, R. C. Collison, and A. C. Whittier. Apr., 1910.
216. Spraying machinery. By W. H. Goodwin. Apr., 1910.
217. Apple culture in Ohio. By F. H. Ballou. May, 1910.
218. The status of the potato-growing industry in Ohio. By F. H. Ballou.—Seasonal notes on potatoes. By J. H. Gourley. June, 1910.
219. The relative durability of post timbers. By J. J. Crumley. June, 1910.
220. Twenty-ninth annual report for 1909-10. By C. E. Thorne [and others].—Meteorological summary for 1909. By C. A. Patton.—Press bulletins [304-314]. July, 1910.
221. The composition of wheat: Influence of various factors on the phosphorus, potassium, and nitrogen content of the wheat plant. By J. W. Ames. Nov., 1910.
222. The mineral nutrients in blue-grass. By E. B. Forbes, A. C. Whittier, and R. C. Collison. Dec., 1910.
223. Fourth annual report on forest conditions in Ohio. By W. J. Green. Nov., 1910.
224. The rejuvenation of orchards: Report of spraying experiments in southeastern Ohio, 1910. By F. H. Ballou. Dec., 1910.
225. The farm grasses of Ohio. By C. G. Williams. Jan., 1911.
226. The wheat joint worm. By J. S. Houser. Feb., 1911.
227. Farm equipment. By L. W. Ellis. Feb., 1911.
228. Two recent important cabbage diseases of Ohio. By T. F. Manns. Mar., 1911.
229. The Fusarium blight (wilt) and dry rot of the potato: Preliminary studies and field experiments. By T. F. Manns. May, 1911.
230. Thirtieth annual report for 1910-1911. By C. E. Thorne [and others].—Meteorological summary for 1910. By C. A. Patton.—Press bulletins [315-322]. July, 1911.
231. Wheat experiments. By C. G. Williams and F. A. Welton. July, 1911.
232. Spray calendar with seed, soil, and disinfection treatment methods. By W. J. Green, A. D. Selby, and H. A. Gossard. Dec., 1911. A revision of 199. See 309.
233. Fall manual of practice in economic zoology. By H. A. Gossard. Nov., 1911.
234. Flour mill fumigation. By W. H. Goodwin. Jan., 1912.
235. The climate of Ohio. By J. W. Smith. Jan., 1912.
236. Strawberry notes for 1910-11. By W. J. Green, J. H. Gourley, and Paul Thayer. Feb., 1912.
237. The soybean and cowpea. By C. G. Williams and F. A. Welton. Feb., 1912.
238. Tobacco culture in Ohio: Results of investigations from 1903 to 1911. By A. D. Selby and True Houser. Mar., 1912.
239. Tobacco: Breeding cigar filler in Ohio, report in hybridizing and selection work in the Miami Valley district, 1903-1911. By A. D. Selby and True Houser. Apr., 1912.
240. The rejuvenation of orchards: Report of spraying, fertilization, and thinning experiments in southeastern Ohio, 1911. By F. H. Ballou. June, 1912.

241. County experiment farms in Ohio: Their organization and work in 1911. By C. E. Thorne, C. G. Williams, and Charles McIntire. June, 1912.
242. Forage crops for swine. By B. E. Carmichael and G. R. Eastwood. June, 1912.
243. Effect of fertilizers on the physical and chemical properties of wheat. By J. W. Ames, G. E. Boltz, and J. A. Stenius. June, 1912.
244. Sweet clover (*Melilotus*): A field survey of its distribution, soil adaptation, habits, and agricultural value. By W. A. Lloyd. June, 1912.
245. Rations for fattening range lambs. By B. E. Carmichael and J. W. Hammond. June, 1912.
246. Barnyard manure: Production, composition, conservation, reinforcement, and value. By J. W. Ames and E. W. Gaither. June, 1912.
247. Nitrogen and mineral constituents of the alfalfa plant. By J. W. Ames and G. E. Boltz. June, 1912.
248. Spraying machinery accessories. By W. H. Goodwin. June, 1912.
249. Thirty-first annual report for the year ending June 30, 1912. By C. E. Thorne [and others].—Ohio weather in 1911. By J. W. Smith and C. A. Patton.—Meteorological summary for 1911. By C. A. Patton.—Press bulletins [323-348]. July, 1912.
250. Some Ohio birds. By H. A. Gossard and S. G. Harry. Aug., 1912.
251. The wheat leafminer (*Agromyza parvicornis* Loew). By J. S. Houser. Sept., 1912.
252. Early cabbage. By W. J. Green and S. N. Green. Dec., 1912.
253. Insect pests of the household. By R. D. Whitmarsh. Dec., 1912.
254. Fifth annual report of forest conditions in Ohio. By Edmund Secrest. Dec., 1912.
255. Mineral and organic analyses of foods: New methods for the determination of sodium and crude fiber. By E. B. Forbes, F. M. Beegle, and J. E. Mensching. Jan., 1913.
256. The Miami County experiment farm: Second annual report for 1912. By Charles McIntire.—The family apple orchard. By W. J. Green.—Some animal parasites of the Miami County hog. By D. C. Mote. Feb., 1913.
257. Oats. By C. G. Williams and F. A. Welton. Feb., 1913.
258. The Paulding County experiment farm: Second annual report for 1912. By Charles McIntire. Feb., 1913.
259. Ohio weather for 1912. By J. W. Smith and C. A. Patton. Mar., 1913.
260. The maintenance of fertility: The Strongsville experiments. [By C. E. Thorne and Edward Mohn]. Apr., 1913.
261. Soil investigations: Composition of calcareous and noncalcareous soils (with special reference to phosphorus supply). By J. W. Ames and E. W. Gaither. June, 1913.
262. Experiments with poultry. By R. M. Sherwood and W. J. Buss. June, 1913.
263. Thirty-second report for 1912-1913. By C. E. Thorne [and others].—Press Bulletins [349-352]. July, 1913.
264. Orchard bark beetles and pin hole borers. By H. A. Gossard. Oct., 1913.
265. The cobrot of corn. By E. G. Arzberger. Nov., 1913.
266. Labor cost of producing corn in Ohio. By L. H. Goddard and W. L. Elser. Dec., 1913.
267. The value of soybean and alfalfa hay in milk production. By R. E. Caldwell. Dec., 1913.
268. Substitutes for corn in rations for fattening swine. By G. R. Eastwood. Jan., 1914.
269. Forage crops. Annual grasses and roots. By C. G. Williams and F. A. Welton. Jan., 1914.
270. Experiments in winter lamb production. By J. W. Hammond. Feb., 1914.
271. A chemical study of the nutrition of swine. By E. B. Forbes, F. M. Beegle, C. E. Fritz, and J. E. Mensching. Feb., 1914.
272. The Hamilton County experiment farm: Second annual report for the year 1913. May, 1914.
273. The Paulding County experiment farm: Third annual report for 1913. May, 1914.
274. The Miami County experiment farm: Third annual report for 1913. June, 1914.
275. The Clermont County experiment farm: Second annual report for 1913. June, 1914.
276. Sixth annual report on forestry operations. By Edmund Secrest. June, 1914.
277. Ohio weather for 1913. By J. W. Smith and C. A. Patton. June, 1914.
278. Thirty-third annual report for 1913-1914.—By C. E. Thorne [and others].—Press bulletins [353-354]. June, 1914.
279. The maintenance of fertility: Liming the land. By C. E. Thorne. July, 1914.
280. Some important animal parasites affecting Ohio livestock. By D. C. Mote. Dec., 1914.
281. Summer treatment of greenhouse soil. By W. J. Green and S. N. Green. Jan., 1915.
282. Corn experiments. By C. G. Williams and F. A. Welton. Feb., 1915.
283. Specific effects of rations on the development of swine. Second paper. By E. B. Forbes, F. M. Beegle, C. M. Fritz, L. E. Morgan, and S. N. Ruehe. Apr., 1915.
284. Rations for growing and fattening roasters and capons. By W. J. Buss. May, 1915.
285. Tobacco: Influence of fertilizers on composition and quality. By J. W. Ames and G. E. Boltz.—Experiments with fertilizers and manure on tobacco grown continuously and in rotation with wheat and clover. By C. E. Thorne. May, 1915.
286. County experiment farms in Ohio: Annual reports for 1914. By C. W. Montgomery and C. E. Thorne. May, 1915.
287. Ohio weather for 1914. By J. W. Smith and C. A. Patton. June, 1915.
288. Thirty-fourth annual report for 1914-15. By C. E. Thorne [and others]. Press bulletins [355-359]. June, 1915.
289. Raising dairy heifers: Cost, feeding and care. By C. C. Hayden. Aug., 1915.
290. Varieties of apples in Ohio. By W. J. Green, Paul Thayer, J. B. Keil. Dec., 1915.
291. Experiments with laying hens: Range versus confinement; variety versus simple rations; various amounts of protein in rations. By W. J. Buss. Feb., 1916.
292. Sulphur in relation to soils and crops. By J. W. Ames and G. E. Boltz. Mar., 1916.
293. The grape-berry worm (*Polychrosis viteana* Clemens). By W. H. Goodwin. Mar., 1916.
294. Wool studies: Washing before shearing, time of shearing. By J. W. Hammond. Apr., 1916.
295. The mineral metabolism of the milch cow. First paper. By E. B. Forbes and F. M. Beegle. Apr., 1916.
296. Ohio weather for 1915. By J. W. Smith and C. A. Patton. Apr., 1916.
297. The clover leaf tyer (*Ancylist angulifasciana* Zeller). By H. A. Gossard. May, 1916.
298. Wheat experiments. By C. G. Williams. May, 1916.
299. The iodine content of foods. By E. B. Forbes and F. M. Beegle. June, 1916.
300. Thirty-fifth annual report for 1915-16. By C. E. Thorne [and others]. June, 1916.
301. Orchard rejuvenation in southeastern Ohio. By F. H. Ballou and W. J. Green. July, 1916.
302. Marketing of woodlot products. By J. W. Calland. Aug., 1916.
303. County experiment farms in Ohio: Annual reports for 1915. By C. W. Montgomery [and others]. Sept., 1916.
304. The possible Wayne County farm. By C. E. Thorne. Nov., 1916.
305. Raw phosphate rock as a fertilizer. By C. E. Thorne.—Ohio experiments. By C. E. Thorne, C. G. Williams and J. W. Ames. Nov., 1916.
306. Liming and lime requirement of soil. By J. W. Ames and C. J. Schollenberger. Dec., 1916.

307. The lesser peach tree borer (*Synanthedon pictipes* Grote and Robinson). By J. L. King. Jan., 1917.
308. The mineral metabolism of the milch cow: Second paper. By E. B. Forbes [and others]. Jan., 1917.
309. Spray calendar with seed, soil and disinfection treatment methods. By W. J. Green, A. D. Selby, and H. A. Gossard. Jan., 1917. A revision of 232.
310. The green soldier bug (*Nezara hilleris* Say). By R. D. Whitmarsh. Feb., 1917.
311. Distribution of the Ohio broods of periodical cicada with reference to soil. By H. A. Gossard. Mar., 1917.
312. Soybean culture. By C. G. Williams.—Uses of soybeans. By J. B. Park. Mar., 1917.
313. Dependable fruits. By W. J. Green, Paul Thayer, and J. B. Keil. Mar., 1917.
314. Ohio weather for 1916. By W. H. Alexander and C. A. Patton. June, 1917.
315. Thirty-sixth annual report for 1916-17. By C. E. Thorne [and others]. June, 1917.
316. Proportions of supplements to corn for fattening swine. By W. L. Robison. Sept., 1917.
317. The pink and green aphid of potato (*Macrosiphum solanifolii* Ashm.). By J. S. Houser, T. L. Guyton, and P. R. Lowry. Nov., 1917.
318. Relation of phosphorus and nitrogen in soil to the composition of wheat. By J. W. Ames and G. E. Boltz. Nov., 1917.
319. Potato diseases. By D. C. Babcock. Nov., 1917.
320. Some external parasites of poultry. By D. C. Mote. Dec., 1917.
321. Tomato diseases in Ohio. By J. G. Humbert. Feb., 1918.
322. Feeding experiments with laying hens: Range versus confinement; variety versus simple rations; comparison of tankage and meat scrap; various amounts of protein in rations; different methods of feeding; egg production of early, medium and late hatched pullets: comparison of corn and wheat. By W. J. Buss. Mar., 1918.
323. County experiment farms in Ohio: Annual reports for 1916 and 1917. By C. W. Montgomery [and others]. May, 1918.
324. Ohio weather for 1917. By W. H. Alexander and C. A. Patton. June, 1918.
325. Thirty-seventh annual report for 1917-18. By C. E. Thorne and others. June, 1918.
326. The agriculture of Ohio: History of Ohio agriculture. By W. A. Lloyd.—Ohio agriculture from 1850 to 1910. By J. I. Falconer.—Crop production in Ohio since 1850. By C. E. Thorne. July, 1918.
327. Clover versus alfalfa for milk production. By C. C. Hayden. July, 1918.
328. Livestock versus grain farming. By C. G. Williams. July, 1918.
329. The peach tree borer (*Sannioidea exitiosa* Say), order, Lepidoptera, family, Aegeriidae. By H. A. Gossard and J. L. King. Sept., 1918.
330. The mineral metabolism of the milch cow. Third paper. By E. B. Forbes [and others]. Sept., 1918.
331. The farmers' elevator movement in Ohio. By H. E. Erdman. Nov., 1918.
332. Destructive insects affecting Ohio shade and forest trees. By J. S. Houser. Nov., 1918. Supersedes 194.
333. Apple blotch, a serious fruit disease. By A. D. Selby. Feb., 1919.
334. Dairy production in Ohio. By R. I. Grady and M. O. Bugby. Feb., 1919.
335. Effect of age of pigs on the rate and economy of gains. By W. L. Robison, Mar., 1919.
336. The maintenance of soil fertility: A quarter century's work with manure and fertilizers. Plans and summary tables of the field experiments at the central farms, Wooster, and the district experiment farms at Strongsville, Germantown, Carpenter and Findlay. [By C. E. Thorne and others.] Apr., 1919.
337. Ohio weather for 1918. By W. H. Alexander and C. A. Patton. June, 1919.
338. Thirty-eighth annual report for 1918-19. By C. E. Thorne [and others]. June, 1919.
339. Orchard rejuvenation in southeastern Ohio. (Second report.) By F. H. Ballou and I. P. Lewis. Apr., 1920.
340. Green forage crops and corn for fattening lambs. By J. W. Hammond. May, 1920.
341. The chrysanthemum gall midge (*Diarthromomyia hypogaea* F. Low). By T. L. Guyton. May, 1920.
342. Organizations among Ohio farmers: Extent and nature of business and farm improvement associations. By H. E. Erdman. June, 1920.
343. The use of forage crops in the fattening of pigs. By W. L. Robison. June, 1920.
344. County experiment farms in Ohio: Annual reports for 1918 and 1919. [By C. W. Montgomery and others.] June, 1920.
345. Ohio weather for the year 1919. By W. H. Alexander and C. A. Patton. June, 1920.
346. Thirty-ninth annual report for 1919-20. By C. E. Thorne [and others]. June, 1920.

## SPECIAL BULLETINS.

1. Bovine tuberculosis in its relation to the public health. Nov., 1898.
2. Proposed slaughter of tuberculous cattle. Mar., 1899.
3. Proposed slaughter of tuberculous cattle. Apr., 1899.
3. Sorghum. By C. E. Thorne. Apr., 1900.
4. Clover seed. By A. D. Selby. Apr., 1900.

## TECHNICAL BULLETINS.

- Vol. I, No. 1. Preparatory stages of the 20-spotted ladybird; studies in pond life; a partial bibliography of insects affecting clover. By C. M. Weed. Oct., 1889.
- Vol. I, No. 2. Flowering plants on grounds of the Ohio State University. By Moses Craig.—Fourth contribution to life history of the known plant lice. By C. M. Weed.—Descriptive catalogue of the shells of Franklin County, Ohio. By H. A. Surface. May, 1890.
- Vol. I, No. 3. Entomological and botanical papers. By F. M. Webster [and others]. Apr., 1893.
- Vol. I, No. 4. A preliminary list of the birds of Wayne County, Ohio. By H. C. Oberholser. July, 1896.
5. A review of the literature of phosphorus compounds in animal metabolism. By E. B. Forbes and M. H. Keith. Mar., 1914.
6. The metabolism of organic and inorganic compounds of phosphorus. By E. B. Forbes [and others]. Mar., 1914.
7. On nitrification: Preliminary observations. By E. R. Allen and A. Bonazzi. Apr., 1915.
8. Studies on the estimation of inorganic phosphorus in plant and animal substances. By E. B. Forbes, F. M. Beegle, and A. F. D. Wussow. June, 1915.

## MISCELLANEOUS.

Wood-using industries of Ohio. By C. W. Dunning. 1912.

## INDEXES.

General index to reports and bulletins volumes 1-20, 1882-1901 (Ohio Agr. Expt. Sta. Bul. 128, Index supplement).

## OKLAHOMA.

## Oklahoma Agricultural Experiment Station, Stillwater.

## BULLETINS.

1. General information, organization, and history. By J. C. Neal and A. C. Magruder. Dec., 1891.
2. Station record. By J. C. Neal. Mar., 1892.
3. Station notes: Insects. By J. C. Neal. June, 1892.
4. Tests of varieties: Oats, corn, spring wheat, Irish and sweet potatoes. By A. C. Magruder and J. C. Neal. Oct., 1892.
5. Some soil analyses. By G. L. Holter and J. C. Neal. Jan., 1893.
6. Notes of progress, analyses i. e. Notes of progress. By J. C. Neal.—Test of varieties of grasses. By A. C. Magruder.—Some analyses of cowpeas and prairie grass. By G. L. Holter. May, 1893.
7. Water analyses. By G. L. Holter. July, 1893.
8. Tests of varieties of wheat. By A. C. Magruder. Oct., 1893.
9. Tests of varieties of vegetables, 1893. By F. A. Waugh.—Annual report of receipts and expenditures of the Oklahoma Experiment Station for the year ending June 30, 1893. Jan., 1894.
10. Corn. By A. C. Magruder. Apr., 1894.
11. Press bulletin excerpts [from Press bulletins 1-15]. July, 1894.
12. Wheat. By A. C. Magruder. Sept., 1894.
13. Wheat feeding. By J. C. Neal. Dec., 1894.
14. Grapes, 1894. By F. A. Waugh. Jan., 1895.
15. Garden vegetables, 1894. By F. A. Waugh. Feb., 1895.
16. Oats. By A. C. Magruder. Mar., 1895.
17. Oklahoma weeds. By J. C. Neal. Dec., 1895. See 41.
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19. Methods of destroying chinch bugs. By G. E. Morrow. Apr., 1896.
20. Wheat experiments, 1895-96. By G. E. Morrow.—Food value of corn scorched by hot winds. By G. L. Holter.—Fruit culture in Oklahoma. By H. E. Glazier.—Peach rosette; the melon louse (*Aphis cucumeris*). By E. E. Bogue. June, 1896.
21. Experiments in corn culture, 1896. By G. E. Morrow and J. H. Bone.—Road making and repairing. By G. E. Morrow. Sept., 1896.
22. Climate and crops in Oklahoma; field experiments with kafir corn. By G. E. Morrow. Jan., 1897.
23. Cotton culture in Oklahoma. By G. E. Morrow. Feb., 1897.
24. Oklahoma soil studies. By J. H. Bone. May, 1897.
25. Loss by exposure of corn stover and teosinte; composition of pie melon; fertilizer analyses of castor bean plant. By G. L. Holter and John Fields. June, 1897.
26. Some injurious orchard insects. By E. E. Bogue. June, 1897.
27. Glanders; Texas fever; symptomatic anthrax. By L. L. Lewis. June, 1897.
28. Experiments with wheat, 1896-97. By G. E. Morrow and J. H. Bone. June, 1897.
29. A study of waters for irrigation; the irrigation plant. By G. L. Holter and John Fields. Sept., 1897.
30. Oklahoma weather and crops for 1897. By G. E. Morrow. Jan., 1898.
31. Strawberries; grapes; stimulating and holding fruit buds. By H. E. Glazier. Feb., 1898.
32. Practical chemistry of soils and crops; a study of the castor-oil plant. By G. L. Holter and John Fields. Mar., 1898.
33. Experiments with field crops, 1897. By G. E. Morrow and J. H. Bone. Mar., 1898.
34. The San José scale in Oklahoma. By E. E. Bogue. May, 1898.
35. Summary of digestion experiments with kafir. Nov., 1898. For full report see 37.
36. Summary of experiments with corn and wheat, 1898. Nov., 1898.
37. Digestion experiments and fodder analyses. By G. L. Holter and John Fields. Apr., 1899.
38. Analyses of waters for irrigation. By G. L. Holter and John Fields. Apr., 1899.
39. Texas fever. By L. L. Lewis. May, 1899.
40. Bacteriology of milk. By L. L. Lewis. May, 1899.
41. Weeds of Oklahoma. By E. E. Bogue. May, 1899. Supersedes 17.
42. Oklahoma soil studies. By J. H. Bone. June, 1899.
43. Fruits for Oklahoma. By O. M. Morris. Nov., 1899.
44. Field crops, 1899. [By F. C. Burtis, G. E. Morrow, and J. H. Bone.] Dec., 1899.
45. An annotated catalog of the ferns and flowering plants of Oklahoma. By E. E. Bogue. Mar., 1900. Also popular edition.
46. Digestion trials. By John Fields and A. G. Ford. May, 1900.
47. Reports of wheat raisers. By John Field.—Experiments with wheat. By F. C. Burtis and J. G. Kerr. Sept., 1900.
48. Crop and forage notes, 1900. By F. C. Burtis. Dec., 1900.
49. A rhizomorphic rot of fruit trees. By E. M. Wilcox. Feb., 1901. Also popular edition.
50. Manuring the soil. By John Fields. Apr., 1901.
51. Feeding cotton-seed meal to hogs. By F. C. Burtis and J. S. Malone. Dec., 1901.
52. The potato crop; variety tests of cabbage. By O. M. Morris. Dec., 1901.
53. Common parasites of domestic animals. By L. L. Lewis. June, 1902.
54. The improvement of the castor plant. By W. R. Shaw. June, 1902.
55. Bermuda grass. By John Fields. Dec., 1902.
56. Garden vegetables. By O. M. Morris. Dec., 1902.
57. Directions for using vaccine for the prevention of blackleg in cattle. By L. L. Lewis. Mar., 1903.
58. Fattening steers: using cotton seed, cottonseed meal, wheat meal, wheat straw, and hay. By F. C. Burtis and John Fields. June, 1903.
59. Reprints from Bulletins Nos. 47, 50, and 52, and annual reports 8 to 11 (for the use of settlers). Sept., 1903.
60. Planting trees for posts, fuel, and wind-breaks. By O. M. Morris. Dec., 1903.
61. Field experiments. By F. C. Burtis and L. A. Moorhouse. Jan., 1904.
62. Disinfecting power of coal-tar dips. By L. L. Lewis and J. F. Nicholson. May, 1904.
63. Tuberculosis in hogs. By L. L. Lewis. May, 1904.
64. Destroying insects and fungus diseases. By O. M. Morris. Jan., 1905.
65. Wheat growing. By F. C. Burtis and L. A. Moorhouse. June, 1905.
66. The water supply: Bacteriological examinations of water from ponds, tanks, and cisterns. By John Fields. June, 1905.
67. Miscellaneous water analyses. By A. G. Ford. June, 1905.
68. Soil inoculation: Tubercle-forming bacteria of legumes. By L. L. Lewis and J. F. Nicholson. Dec., 1905. Also popular edition.

69. Smallfruits. By O. M. Morris and J. F. Nicholson. Dec., 1906.
70. Hardy Bermuda grass. By John Fields. Apr., 1906.
71. Alfalfa. By F. C. Burtis and L. A. Moorhouse. June, 1906.
72. Tests of dips as lice killers. By L. L. Lewis. June, 1906.
73. Hardy trees, shrubs, and vines suitable for planting in Oklahoma. By O. M. Morris. Apr., 1907.
74. Cowpeas and soy beans. By L. A. Moorhouse. Apr. 1907.
75. A study of the bacterial content of cream. By L. L. Lewis and W. R. Wright. June, 1907.
76. Orchard spraying. By O. M. Morris and J. F. Nicholson. Feb., 1908.
77. Cotton culture. By L. A. Moorhouse and J. F. Nicholson. Mar., 1908.
78. Sheep feeding. By W. T. McDonald and J. S. Malone. Apr., 1908.
79. San José scale in Oklahoma. By J. F. Nicholson. Apr., 1908.
80. Rations for fattening hogs. By W. T. McDonald and J. S. Malone. May, 1908.
81. Texas fever. By L. L. Lewis. June, 1908.
82. Alfalfain Oklahoma. By L. A. Moorhouse and W. L. Burlison. Jan., 1909.
83. Alfalfa seed in Oklahoma. By L. A. Moorhouse and W. L. Burlison. Feb., 1909.
84. Variety test of peaches. By O. M. Morris. June, 1909.
85. Bermuda grass. By L. A. Moorhouse, W. L. Burlison, and J. A. Ratcliff. June, 1909.
86. Tree culture. By O. M. Morris. Feb., 1910.
87. Indian corn culture. By L. A. Moorhouse, W. L. Burlison, and J. A. Ratcliff. Feb., 1910.
88. The southern plum aphid (*Aphis scartariae* Thos.). By C. E. Sanborn. Mar., 1910.
89. The chemistry of the kafir corn kernel. By R. O. Baird. June, 1910.
90. A study of Bermuda grass: I, Cultivation and value; II, chemical composition; III, digestion experiments. By C. K. Francis and R. O. Baird. Nov., 1910.
91. The twig girdler (*Oncideres cingulata* and *texana*). By C. E. Sanborn. Mar., 1911.
92. Spray calendar. By A. L. Lovett. Apr. 1911.
93. Artificial insemination. By L. L. Lewis. May, 1911.
94. Hog feeding. By W. A. Linklater. July, 1912.
95. Varieties of fruits raised in Oklahoma. By N. O. Booth and D. C. Mooring. Nov., 1911.
96. The vitality of reproductive cells. By L. L. Lewis. Dec., 1911.
97. Cotton culture. By O. O. Churchill and A. H. Wright. Mar., 1912.
98. The cotton or melon aphid. By C. E. Sanborn. Aug., 1912.
99. Dairying in Oklahoma: Some results obtained in feeding dairy cows. By R. C. Potts.—Principles of feeding, feeding dairy cattle and experiments in milk production. By C. I. Bray.—Care and management of dairy cattle. By C. I. Bray. June, 1913.
100. Garden and truck crop insect pests. By C. E. Sanborn. Oct., 1912.
101. Silos in Oklahoma. By C. I. Bray and D. R. Forrester. July, 1914.
102. The grain sorghums. By O. O. Churchill and A. H. Wright. Oct., 1914.
103. Sudan grass. By R. E. Karper. Jan., 1915.
104. Hog cholera. By L. L. Lewis, W. P. Shuler, C. H. McElroy, and L. B. Ritter. Dec., 1914.
105. Cowpea culture. By O. O. Churchill. Nov., 1914.
106. Poultry: Breeds and breeding, poultry diseases, farm poultry housing. By A. F. Rolf. Incubation, brooding, and feeding. By L. F. Payne. Dec., 1914.
107. Using the Babcock test. By J. M. Fuller. June, 1915.
108. The production of first-grade cream. By R. C. Potts. Jan., 1916.
109. The alfalfa web worm. By C. E. Sanborn. Feb., 1916.
110. The starches of the grain sorghums: A technical bulletin. By C. K. Francis and O. C. Smith. Feb., 1916.
111. Sheep husbandry in Oklahoma. By W. L. Carlyle and D. A. Spencer. Oct., 1916.
112. A study of the effect of cottonseed meal vs. beef scrap upon the egg production, fertility, and vitality of poultry. By B. A. Ahrens. Jan., 1917.
113. The locust borer (*Cyrtene robiniae* Forst.). By C. E. Sanborn and H. R. Painter. Mar., 1917.
114. The determination of fat in certain milk products. By C. K. Francis and D. G. Morgan. Apr., 1917.
115. Sudan grass silage. By C. K. Francis and W. G. Friedemann. Apr., 1917.
116. The sycamore lace bug (*Corythucha ciliata* Say). By Otis Wade. July, 1917.
117. The fats and fatty acids of the grain sorghums: A technical bulletin. By C. K. Francis and W. G. Friedemann. Oct., 1917.
118. The chicken tick (*Argas miniatus* Koch). By C. E. Sanborn and H. R. Painter. May, 1918.
119. Report of experiments on immunizing against hog cholera. By L. L. Lewis and C. H. McElroy. July, 1918.
120. A preliminary report on feeds fattening pigs comparing protein supplements for fattening pigs, and comparing corn, kafir, and darso as a fattening feed for pigs. By J. S. Malone. Oct., 1918.
121. Experiments with bolly refuse: The economic uses to which bolly refuse may be placed, and the composition of bolly, cotton seed and their products. By C. T. Dowell and W. G. Friedemann. Dec., 1918.
122. A study of the cyanogenesis in *Sorghum vulgare*. (Technical.) By C. T. Dowell. Mar., 1919.
123. The chicken sticktight flea (*Sarcophylla gallinacea* Westw.). By C. E. Sanborn. Feb., 1919. See 130.
124. The effect of feeding peanuts on the quality of pork. By C. T. Dowell and W. G. Friedemann. May, 1919.
125. Comparative rations for wintering breeding ewes. By S. F. Russell. July, 1919.
126. Sheep-breeding experiment: Inheritance of characters in sheep. (Technical.) By S. F. Russell. July, 1919.
127. Darso. By M. A. Beeson and Adrian Daane. Sept., 1919.
128. The crow (*Corvus brachyrhynchos* Brehm). By C. E. Sanborn, R. O. Whittenton, and C. O. Chambers. Oct., 1919.
129. The four-spotted cowpea weevil (*Bruchus quadrimaculatus* Fabricius). By Otis Wade. Nov., 1919.
130. The chicken sticktight flea (*Sarcophylla gallinacea* Westw.). By C. E. Sanborn. Feb., 1920. A revision of 123.
131. Bacterial blight of beans: A technical study. By C. W. Rapp. July, 1920.
132. The composition and digestibility of sudan grass hay, darso, darso silage, broom corn seed and sunflower silage. By C. T. Dowell and W. G. Friedemann. July, 1920.
133. Sheep feeding investigations: Comparative rations for fattening wether lambs. By W. T. Magee and A. E. Darlow. Sept., 1920.
134. Cattle feeding investigations. By W. L. Blizzard. Sept., 1920.

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1. Texas cattle fever. By J. C. Neal and M. Francis. Oct., 1892.

## OREGON.

## Oregon Agricultural Experiment Station, Corvallis.

## BULLETINS.

1. History and organization. By E. Grimm. Oct., 1888.
2. Horticultural; Preparation and notes on future work. By E. R. Lake. Jan., 1889.
3. Practical work with insecticides. By E. R. Lake.—Corn worm; insecticides; spraying machines; directions for sending insects. By F. L. Washburn.—Some investigations on plants poisonous to stock. By P. H. Irish. Oct., 1889.
4. Notes on farm crops. By E. Grimm.—Notes on vegetables; ornamental trees and shrubs; orchard and small fruits. By E. R. Lake.—Wheat, mineral waters, apparatus, soil analysis, etc. By P. H. Irish and W. D. Bigelow. Jan., 1890.
5. Entomology; Introductory; some injurious insects and remedies therefor; experiments with grain beetle. By F. L. Washburn.—Zoology; Gophers and rabbits. By F. L. Washburn.—Chemistry; fertilizers. By P. H. Irish and W. D. Bigelow. Apr., 1890.
6. Chemistry; Examination of cattle foods. By P. H. Irish.—Economic zoology; Circular No. 1, General information. By F. L. Washburn. July, 1890.
7. Comparative tests of small fruits and vegetables. First results. By George Coote. Oct., 1890.
8. Notes on varieties of wheat and flax. By H. T. French. Jan., 1891.
9. Silos and ensilage. By H. T. French. Feb., 1891.
10. Entomology; Practical work at station: Experiments with codling moth and with a combined fungicide and insecticide. By F. L. Washburn.—Hop louse, life history, prevention, remedies, etc. By F. L. Washburn. Apr., 1891.
11. Notes on grasses and potatoes. By H. T. French. May, 1891.
12. Comparative test of strawberries for 1891. By George Coote.—Meteorological summary. By John Fulton. May, 1891.
13. Mineral and mineral water analyses; soils and agricultural survey. By G. W. Shaw and Dumont Lotz. [May], 1891.
14. A plain talk about insects; some injurious insects of 1891; the grain beetle (*Sitona swinamensis*); a sugar beet beetle (*Monoxia guttulata*); Tent caterpillars; the branch and twig burrower (*Polycaon confertus* Lecote). By F. L. Washburn. [May], 1891.
15. Horticulture. By George Coote. Jan., 1892.
16. Notes on varieties and yield of wheat. By H. T. French and C. D. Thompson. Feb., 1892.
17. Sugar beet. By G. W. Shaw and Dumont Lotz. Feb., 1892.
18. Insects injurious to young fruit trees; codling moth; kerosene emulsion wireworms; flea beetles. By F. L. Washburn. Mar., 1892.
19. Some Oregon weeds and how to destroy them. By Moses Craig. May, 1892.
20. Experiments in pig feeding. By H. T. French and C. D. Thompson. Sept., 1892.
21. The soils of Oregon. By G. W. Shaw and Dumont Lotz. Oct., 1892.
22. Comparative test of small fruits and notes; comparative test of vegetables with notes; renovations of old orchards. By George Coote.—Meteorological summary. By John Fulton. Jan., 1893.
23. Experiments in the culture of the sugar beet in Oregon. By G. W. Shaw. Feb., 1893. Superseded by Bul. 44.
24. Potatoes; roots. By H. T. French. Mar., 1893.
25. Codling moth and hop louse; gophers and moles. By F. L. Washburn. Apr., 1893.
26. Drainage. By J. M. Bloss. May, 1893.
27. Plant diseases: Their cause and prevention. By Moses Craig. Dec., 1893.
28. Continuation of experiments in pig feeding. By H. T. French. Jan., 1894.
29. Notes on vegetables, fruits, pruning, etc. By George Coote. Feb., 1894.
30. Potatoes; roots. By H. T. French. Mar., 1894.
31. Entomological department; Progress of work; codling moth, hop louse, flea-beetles, radish flies, cutworms and wireworms, tent caterpillars, illustrations of Oregon insects and insect work, gophers and moles; capons and caponizing. By F. L. Washburn. Apr., 1894.
32. Five farmers' fogs: Canadathistle, sow thistle, bull thistle, Chinese thistle, Russian thistle. By Moses Craig. Nov., 1894.
33. Tent caterpillars; the grain plant louse (*Siphonophora asenae* Fab.); the pear leaf blister: the clover mite *Eryobia pratensis* Garman; Koebele's resin wash. By F. L. Washburn. Dec., 1894.
34. Fruits and vegetables; Notes on the comparative date of blooming and pollen production of varieties of apples, pears, plums, and cherries; notes on vegetables. By George Coote. Feb., 1895.
35. Forage plants; pig feeding. By H. T. French. Mar., 1895.
36. Composition and use of fertilizers. By G. W. Shaw. Apr., 1895.
37. Experiments in cattle feeding. By H. T. French. May, 1895.
38. Fruit pests. By F. L. Washburn. Sept., 1895.
39. A study in the economy of cattle foods. By G. W. Shaw. Dec., 1895.
40. Prunes, apples, and pears in Oregon. By U. P. Hedrick. Jan., 1896.
41. Spraying bulletin. By U. P. Hedrick and A. B. Cordley. Feb., 1896. See 108.
42. Feeding sheaf wheat; (a) pigs, (b) steers; feeding potatoes to pigs. By H. T. French. Mar. 1896.
43. Flax culture. By H. T. French. Feb., 1897.
44. A review of Oregon sugar beets. By G. W. Shaw and H. B. Miller. Mar. 1897. Superseded 23.
45. Prunes in Oregon: Is there permanent prosperity for the Oregon prune industry? By H. B. Miller.—Prune growing in Oregon. By U. P. Hedrick.—The fruit soils of Oregon; the composition of Oregon prunes. By G. W. Shaw.—Insects of the prune. By A. B. Cordley. June, 1897.
46. A plant that poisons cattle (*Cicuta vagans* Greene). By U. P. Hedrick. June, 1897.
47. The relative digestibility of cheat and clover. By G. W. Shaw and H. T. French. Sept., 1897.
48. Spraying. By A. B. Cordley. Jan., 1898. See 108.
49. Paris green. By G. W. Shaw and J. F. Fulton. Jan., 1898.
50. The fertility of Oregon soils. By G. W. Shaw. Feb., 1898.
51. Marketing fruit. By Moses Craig. Mar., 1898.
52. The cultivation of the hazel nut; also notes on varieties of pears and peaches. By George Coote. Apr., 1898.
53. Sugar beets, 1897. By G. W. Shaw. Apr., 1898.
54. Notes on flax and hemp. By H. T. French.—Dairy rations. By F. L. Kent.—Fresh vs. stripper cow butter. By F. L. Kent.—Feeding pumpkins to pigs; feeding artichokes to pigs. By H. J. French. May, 1898.
55. Chemical studies of Oregon fruits: Cherries. By G. W. Shaw. Nov., 1898.
56. Chemical studies of Oregon fruits: Points on prune dipping. By G. W. Shaw. Mar., 1899.
57. Brown rot. By A. B. Cordley. Apr., 1899.
58. Rose culture in Oregon. By George Coote [and Mrs. H. B. Killin]. June, 1899.



59. Sugar-beet experiments of 1898 and final conclusions. By G. W. Shaw. Dec., 1899.
60. Apple-tree anthracnose, a new fungous disease. By A. B. Cordley. Jan., 1900.
61. The Oregon prune, its composition, food value, soil draught. By G. W. Shaw. Mar., 1900.
62. Miscellaneous investigations. By G. W. Shaw. June, 1900.
63. A preliminary bulletin on the prevention of smut on oats. By E. F. Pernot. Nov., 1900.
64. Investigations of diseases in poultry. By E. F. Pernot. Dec., 1900.
65. Creameries and cheese factories of western Oregon. By F. L. Kent. Jan., 1901.
66. The grape in Oregon: I, Western Oregon. By E. R. Lake. June, 1901.
67. The silo and silage. By James Withycombe. June, 1901.
68. Annotated list of the birds of Oregon. By A. R. Woodcock. Jan., 1901.
69. The codling moth and late spraying in Oregon. By A. B. Cordley.—Spraying. By E. L. Smith.—Method of spraying for the codling moth. By J. D. Olwell. Feb., 1902.
70. Testing milk and cream. By F. L. Kent. May, 1902.
71. Stagnant water germs in milk. By E. F. Pernot. June, 1902.
72. Preliminary report on steamed silage. By James Withycombe and A. L. Knisely. June, 1902.
73. Notes on vinegar making. By E. F. Pernot. Oct., 1902.
74. The cultivation of vegetables and notes on varieties. By George Coote. Feb., 1903. See also 77.
75. Insecticides and fungicides. By A. B. Cordley. Mar., 1903. Second edition, Feb., 1906. See 108.
76. Leguminous forage plants. By James Withycombe. June, 1903. Second edition, Feb., 1906.
77. A continuation of Bulletin 74 on onions; also notes on strawberries and varieties of vegetables. By George Coote. Dec., 1903.
78. Canning cheese. By E. F. Pernot. Mar., 1904.
79. Plant food and use of fertilizers. By A. L. Knisely. Mar., 1904.
80. Somer sets in swine feeding. By James Withycombe. Apr., 1904.
81. The apple in Oregon: I, Early history, earliest varieties later plantings, the problem of planting, site as to soil, site as to aspect, selection of trees, planting. By E. R. Lake. July, 1904.
82. The apple in Oregon: II, Varieties for home use, pollination, tillage, cover crops, pruning. By E. R. Lake. Nov., 1904.
83. The perpetuation of pure cultures for butter starters. By E. F. Pernot. Dec., 1904.
84. Poultry under confinement. By James Withycombe. Mar., 1905.
85. Digestibility of vetch hay and corn silage. By James Withycombe and A. L. Knisely. Mar., 1905.
86. Irrigation in Klamath County. By F. L. Kent. Apr., 1905.
87. Canning fruit and vegetables; preserving fruit juices. By E. F. Pernot. Jan., 1906.
88. San José scale. By A. B. Cordley. Mar., 1906.
89. Efficiency of cream separators under farm conditions. By I. P. Whitney. Dairy school cream separator tests. By F. L. Kent. June, 1906.
90. Acid soils. By A. L. Knisely. May, 1906.
91. Farm practice with forage crops in western Oregon and western Washington. By Byron Hunter. Nov., 1906.
92. The walnut in Oregon. By C. I. Lewis. Dec., 1906.
93. Orchard management. By C. I. Lewis and W. H. Wicks. Feb., 1907. See 111.
94. The apple from orchard to market. By C. I. Lewis.—[Hood River Apple Growers' Union. Instructions to packers; constitution, etc.] By E. H. Shepard. Feb., 1907.
95. Disease of turkeys (infectious entero-hepatitis). By E. F. Pernot. Jan., 1907.
96. The poultry industry in Oregon. By James Dryden. Dec., 1907.
97. Comments upon the State fertilizer law. By A. L. Knisely. Jan., 1908.
98. Preserving wild mushrooms. By E. F. Pernot. Jan., 1908.
99. Orchard survey of Wasco County. By C. I. Lewis and R. W. Allen. Mar., 1908.
100. Incubation experiments. By James Dryden. Aug., 1908.
101. Orchard survey of Jackson County. By C. J. Lewis, S. L. Bennett, and C. C. Vincent. Oct., 1908.
102. Digestibility of kale, vetch hay, steamed and unsteamed silage. By James Withycombe and C. E. Bradley. Nov., 1908.
103. An investigation of the mortality of incubator chicks. By E. F. Pernot. Dec., 1908.
104. Pollination of the apple. By C. I. Lewis and C. C. Vincent. Feb., 1909.
105. Culture of small fruits. By C. I. Lewis and C. A. Cole. Mar., 1909.
106. Spraying for peach fruit spot. By A. B. Cordley and C. C. Cote. Aug., 1909.
107. Commercial fertilizers and insecticides. By C. E. Bradley. Jan., 1910.
108. Insecticides and fungicides: Brief directions for their preparation and use. By A. B. Cordley. Apr., 1910. Supersedes 41, 48, and 75.
109. A preliminary report on the vegetable growing industry in Oregon. By A. G. B. Bouquet. Oct., 1910.
110. Preliminary frost fighting studies in the Rogue River Valley. By C. I. Lewis and F. R. Brown. Aug., 1911.
111. Orchard management. By C. I. Lewis. Sept., 1911. Supersedes 93.
112. The soils of Oregon. By C. E. Bradley. Jan., 1912.
113. Orchard irrigation studies in the Rogue River Valley. By C. I. Lewis, E. J. Kraus, and R. W. Rees. May, 1912.
114. Hop investigations. By H. V. Tartar and Bert Pilkington. Jan., 1913.
115. Biennial report, division of horticulture. First biennial report, substation Umatilla experiment farm, Hermiston, Oregon. By R. W. Allen.—Southern Oregon experiment station, Talent, Oregon. By F. C. Reimer. Nov., 1912.
116. A preliminary report on the pollination of the sweet cherry. By V. R. Gardner. Aug., 1913.
117. Loganberry by-products. By C. I. Lewis and F. R. Brown. Apr., 1914.
118. Ammonification and nitrification studies of certain types of Oregon soils. By T. D. Beckwith, A. F. Vass, and R. H. Robinson. June, 1914.
119. A report of the experimental and demonstration work on the substation farms at Moro, Burns, Redmond, and Metolius: I, Tillage and cropping methods. By H. D. Scudder. Jan., 1914.
120. Improving sandy soils by the use of green manure crops. By R. W. Allen and W. K. Dean. Aug., 1914.
121. The common red spider or spider mite. By H. E. Ewing. Aug., 1914.
122. Irrigation and soil-moisture investigations in western Oregon. By H. D. Scudder and W. L. Powers. Aug., 1914.
123. An inquiry into the nature of a somatic segregation of characters in the Le Conte pear. By W. P. Tufts. Dec., 1914.
124. Comparative cooking qualities of some of the common varieties of apples grown in Oregon. By Ava B. Milam and Harriet B. Gardner. Feb., 1915.
125. Windbreaks, hedges, and ornamentals for irrigated sandy soils of eastern Oregon. By R. W. Allen. Feb., 1915.
126. Grape culture, with special reference to commercial production under irrigation in eastern Oregon. By R. W. Allen. Feb., 1915.

127. Experiments in swine feeding. By James Withycombe, E. L. Potter, and G. R. Samson. Mar., 1915.
128. The arsenates of lead. By R. H. Robinson and H. V. Tartar. May, 1915.
129. The pollination of the pomaceous fruits: II, Fruit-bud development of the apple. By F. C. Bradford. May, 1915. For Pt. I see Research Bul. 1.
130. Pruning: Plant physiology as related to pruning. By W. M. Atwood.—The study of fruit buds. By E. J. Kraus.—Pruning young trees. By C. I. Lewis.—Pruning the bearing apple and pear tree. By V. R. Gardner.—Pruning the bearing prune trees. By V. R. Gardner. May, 1915.
131. The calcium arsenates. By R. H. Robinson. June, 1918.
132. Economics of apple orcharding. By C. I. Lewis and H. A. Vickers. June, 1915.
133. Points on the selection, adjustment, and care of farm machines. By E. M. D. Bracker. Aug., 1915.
134. A study of variation in apples during the growing season. By W. E. Whitehouse. June, 1916.
135. Variation of internal structure of apple varieties. By E. J. Kraus. June, 1916.
136. Vegetable tests on sandy soil at the Umatilla experiment farm. By R. W. Allen. Mar., 1916.
137. The drainage of "white land" and other wet lands in Oregon. By W. L. Powers.—Open ditches. By T. A. H. Teeter. July, 1916.
138. The pollination of the pomaceous fruits: III, Gross vascular anatomy of the apple. By E. J. Kraus and G. S. Ralston. May, 1916.
139. Pruning investigations: The early summer pruning of young apple trees. By V. R. Gardner.—The influence of summer pruning on bud development in the apple. By J. R. Magness.—A statistical study of the fruit-spur system of certain apple trees. By A. F. Yeager. Aug., 1916.
140. A preliminary report of cooperative irrigation investigations in Oregon on the economical use of irrigation water. By W. L. Powers.—Relation of proper irrigation to bacterial count. By T. D. Beckwith. Jan., 1917.
141. Report of the Hood River branch experiment station for 1916. Feb., 1917.
142. The culture of small fruits on irrigated sandy land. By R. W. Allen. Mar., 1917.
143. New facts regarding the period of ascopore discharge of the apple scab fungus. By Leroy Childs. May, 1917.
144. Dry farming investigations at the Sherman County branch experiment station. By D. E. Stephens and C. E. Hill. Apr., 1917.
145. The evaporation of prunes. By C. I. Lewis, F. R. Brown, and A. F. Barss. July, 1917.
146. Pruning investigations, second report: Studies in fruit-bud formation. By J. R. Magness.—The relation between angle, length, and diameter of shoots and the development of side shoots and fruit spurs from lateral buds. By A. F. Edminster.—The influence of bending dormant shoots upon their subsequent behavior; the winter heading back and thinning out of apple shoots in young trees. By V. R. Gardner. Oct., 1917.
147. Bark beetles infesting the Douglas fir. By W. J. Chamberlin. Jan., 1918.
148. The life history and control of the rose leaf hopper (*Empoia rosae*): An apple pest. By Leroy Childs. Feb., 1918.
149. Vegetation and reproduction with special reference to the tomato (*Lycopersicon esculentum* Mill.). By E. J. Kraus and H. R. Kraybill. Jan., 1918.
150. Dry farming investigations at the Harney branch station, Burns, Oregon. By L. R. Breithaupt. Feb., 1918.
151. A chemical examination of the loganberry. By M. R. Daughters. Apr., 1918.
152. The western newt or water dog (*Notophthalmus torosus*): A natural enemy of mosquitoes. By A. C. Chandler. June, 1918.
153. The life history and control of the pocket gopher in the Willamette Valley. By H. M. Wight. June, 1918.
154. Preliminary report of pear harvesting and storage investigations in Rogue River Valley. By C. I. Lewis, J. R. Magness, and C. C. Cate. June, 1918.
155. The use of pepsin as a rennet substitute in cheddar cheesemaking. By P. S. Lucas. June, 1918.
156. The part of milk contests in improving the milk supply of Portland, Oregon. By E. C. Callaway and P. S. Lucas. Dec., 1918.
157. Preliminary report on the improvement of marsh lands in western Oregon. By W. L. Powers. Jan., 1919.
158. Pollination of tomatoes. By A. G. B. Bouquet. Mar., 1919.
159. Fertilizer tests for strawberries: Summary of results of experiments extending over three years on red-shot Parkdale loam. By G. G. Brown. Mar., 1919.
160. The smallirrigation pumping plant. By W. L. Powers and W. J. Gilmore. July, 1919.
161. Duty of water in irrigation. By W. L. Powers. Jan., 1920.
162. Pear harvesting and storage investigations in the Rogue River Valley (second report). By C. I. Lewis, A. E. Murneck, and C. C. Cate. July, 1919.
163. Sulfur as a fertilizer for alfalfa in southern Oregon. By R. C. Reimer and H. V. Tartar. July, 1919.
164. The soils of Jackson County. By H. V. Tartar and F. C. Reimer. Jan., 1920.
165. Finishing pigs for market. By E. J. Fjeldsted and E. L. Potter. Oct., 1919.
166. Fertilizers for Oregon orchards: Introduction. By C. I. Lewis.—Nitrogen fertilizers for fruit trees in the Rogue River Valley. By F. C. Reimer.—Recent experiments with nitrate of soda in bearing orchards in Hood River Valley. By G. G. Brown. Feb., 1920.
167. The improvement and irrigation requirement of wild meadow and tule land. By W. L. Powers and W. W. Johnston. Jan., 1920.
168. Survey of typical Oregon farmers' creameries. By Eric Englund. Feb., 1920.
169. Insecticide investigations. By A. L. Lovett. Apr., 1920.
170. The gray garden slug (*Agriolimax agrestis* Linn.), with notes on allied forms. By A. L. Lovett and A. B. Black. June, 1920.
171. Spray gun versus rod and dust in apple orchard pest control. By Leroy Childs. July, 1920.
172. The western pine bark-beetle (*Dendroctonus brevicomis* Lec.), a serious pest of western yellow pine in Oregon. By W. J. Chamberlin. June, 1920.
173. Irrigation of potatoes. By W. L. Powers and W. W. Johnston. Aug., 1920.
174. Fattening steers. By E. L. Potter and Robert Withycombe. Aug., 1920.
175. Fattening lambs: Shelter versus open lot. By Robert Withycombe and E. L. Potter. Sept., 1920.

## RESEARCH BULLETINS.

1. The pollination of the pomaceous fruits: I. Gross morphology of the apple. By E. J. Kraus. Apr., 1913. See also Buls. 129 and 138.
2. An investigation of lime-sulfur injury; its causes and prevention. By V. I. Saffre. July, 1913.
3. A report of chemical investigations on the lime-sulfur spray. By H. V. Tartar. Mar., 1914.
- NOTE.—Series discontinued with No. 3.

## PENNSYLVANIA.

## The Pennsylvania State College Agricultural Experiment Station, State College.

## BULLETINS.

The present series of bulletins was the immediate successor to Bulletins 1-16, 1882-1886, issued by the Pennsylvania State College.

1. Historical sketch of the agricultural experiments conducted by the Pennsylvania State College, 1857-1887; studies upon the composition and development of soiling crops. By William Frear.—Instructions for taking and sending samples. By H. P. Armsby. Oct., 1887.
2. Field experiments with phosphates. By H. P. Armsby. Jan., 1888.
3. Composition and digestibility of corn stover. By H. P. Armsby. Apr., 1888.
4. Seed germinations. By G. C. Butz. July, 1888.
5. The digestibility of soiling rye. By William Frear. Oct., 1888.
6. Tests of varieties, 1888: Wheat, oats, barley, potatoes, forage crops. By W. H. Caldwell. Jan., 1889.
7. Tests of varieties, 1888: Corn. By W. H. Caldwell.—Remarks on the foregoing experiments. [By H. P. Armsby.]—Analyses and valuation of fertilizers. By William Frear. Apr., 1889.
8. Systematic testing of new varieties; germination tests. By G. C. Butz. July, 1889.
9. Digestibility of corn fodder and silage. By H. P. Armsby and W. H. Caldwell. Oct., 1889.
10. Should farmers raise their own vegetable seeds. Notes on new varieties of vegetables. By G. C. Butz.—Tests of agricultural varieties. 1889. By W. H. Caldwell. Jan., 1890.
11. Indian corn as a grain and forage crop. By W. H. Caldwell. Apr., 1890.
12. Simple methods of determining milk fat. By William Frear and G. L. Holter.—Dried brewers' grains. By William Frear. July, 1890.
13. Black knot on plums; a few ornamental plants. By G. C. Butz. Oct., 1890.
14. Tests and varieties of vegetables for 1890. By G. C. Butz. Jan., 1891.
15. Influence of variety and of rate of seeding on the yield of ensilage corn. By H. P. Armsby. Apr., 1891.
16. Culture of the chestnut for fruit. By W. A. Buckhout.—Analysis of several varieties of chestnuts. By William Frear. July, 1891.
17. The value of cotton-seed meal as compared with bran for the production of butter. By T. F. Hunt. Oct., 1891.
18. Notes on new and old varieties of orchard fruits and small fruits. By G. C. Butz. Jan., 1892.
19. Information on spraying fruits. By G. C. Butz. Apr., 1892.
20. Tests of dairy apparatus. By H. P. Armsby, H. J. Waters, and W. H. Caldwell. July, 1892.
21. The Koch test for tuberculosis. By H. P. Armsby. Oct., 1892.
22. Tests of dairy apparatus. By W. H. Caldwell. Jan., 1893.
23. Forest fires. By W. A. Buckhout.—Experience with evergreens in Pennsylvania. By G. C. Butz. Apr., 1893.
24. Influence of quality of food upon economy of milk and butter production. By H. J. Waters, W. H. Caldwell, and R. J. Weld. July, 1893.
25. Small fruits in 1893. By G. C. Butz. Oct., 1893.
26. Mangels and sugar beets versus silage: Yield, cost, and feeding value. By H. J. Waters and R. J. Weld. Jan., 1894.
27. Tests of cream separators. By H. P. Armsby, W. H. Caldwell, and L. E. Reber. Apr., 1894.
28. Cottonseed feed for dairy cows. By H. P. Armsby and E. H. Hess. July, 1894.
29. Tuberculosis of cattle. By Leonard Pearson. Oct., 1894.
30. Tobacco experiments. By William Frear and E. J. Haley. Jan., 1895.
31. Report of the director for 1894. By H. P. Armsby. Apr., 1895.
32. Small fruits in 1894. By G. C. Butz. July, 1895.
33. Directions for using the Babcock milk test. By Harry Hayward and M. E. McDonnell. Oct., 1895.
34. A phosphate deposit in Juniata county. By M. C. Ihseng. Jan., 1896.
35. A soil test with fertilizers. By H. P. Armsby. Apr., 1896.
36. Chestnut culture for fruit. By W. A. Buckhout. May, 1896.
37. The peach industry in Pennsylvania. By G. C. Butz. Nov., 1896.
38. A test of hand separators. By Harry Hayward. Jan., 1897.
39. Variety tests of wheat, oats, and potatoes. By G. C. Watson and E. H. Hess. Nov., 1897.
40. The sugar beet in Pennsylvania. By H. P. Armsby. Dec., 1897.
41. The comparative value of buckwheat, middlings, dried brewers' grains, and cerealine for milk and butter production. By Harry Hayward and R. J. Weld. Dec., 1897.
42. The maintenance ration of cattle. By H. P. Armsby. May, 1898. See 111.
43. Apples in Pennsylvania. By G. C. Butz. July, 1898. See 106 and 128.
44. Commercial butter cultures. By Harry Hayward and M. E. McDonnell. Nov., 1898.
45. Heated milk for butter making. By Harry Hayward and F. F. Pepper. Dec., 1898.
46. Variety tests of wheat. By G. C. Watson and E. H. Hess. July, 1899.
47. Tests of the sugar beet in Pennsylvania. By H. P. Armsby and E. H. Hess. Nov., 1899.
48. Winter versus spring bran. By William Frear and W. A. Hutchinson. Dec., 1899.
49. Field fertilizer experiments on tobacco. By William Frear. Feb., 1900.
50. Distillery waste. By William Frear and C. A. Browne, jr.—Miscellaneous cattle food analyses. By William Frear. Feb., 1900.
51. Small fruits in 1899. By G. C. Butz and J. P. Pillsbury. Apr., 1900.
52. Rye meal and Quaker Oats feed for milk production. Condensed by E. H. Hess from account by Harry Hayward in annual report Pennsylvania State College. 1898-99. [p. 124-141.] June, 1900.
53. Methods of steer feeding. By G. C. Watson and M. S. McDowell. Sept., 1900.
54. The manurial value of the excreta of milch cows. By W. S. Sweetser. Nov., 1900.
55. Variety tests of wheat. By G. C. Watson and E. H. Hess. May, 1901.
56. Methods of dairy feeding. By Harry Hayward. July 1901.
57. Methods of steer feeding. By G. C. Watson and A. K. Risser. Nov., 1901.
58. Weeds in general; two newcomers into Pennsylvania. By W. A. Buckhout. Mar., 1902.
59. Pennsylvania sugar beets in 1901. By William Frear and W. T. Carter. Apr., 1902.
60. The rearing of calves on milk substitutes. By Harry Hayward. July 1902.
61. Annual report of the director. By H. P. Armsby. Oct., 1902.
62. An experiment in ginseng culture. By G. C. Butz. Jan., 1903.
63. Losses in manure. By William Frear. Apr., 1903.
64. Methods of steer feeding: Barn vs. shed. By T. I. Mairs and A. K. Risser. Oct., 1903.
65. Forage and soiling experiments, 1902. By G. C. Watson and T. I. Mairs. Dec., 1903.
66. Spraying grapes for black rot in Erie County, Pa. By G. C. Butz. Jan., 1904.
67. Variety tests of wheat. By G. C. Watson and A. K. Risser. Apr., 1904.

68. Methods of steer feeding: Barn versus shed—second trial. By T. I. Mairs and A. K. Risser. July, 1904.
69. Annual report of the director. Oct., 1904.
70. Condimental, tonic, and other stock foods. By William Frear. Jan., 1905.
71. Relative values of feeding stuffs. By H. P. Armsby. May, 1905. Revised edition, May, 1907.
72. Experiments in growing Sumatra tobacco under shelter tent, 1903. By William Frear. July, 1905.
73. Distillers' dried grains versus cottonseed meal as a source of protein. By H. P. Armsby and A. K. Risser. Sept., 1905.
74. Methods of steer feeding: Barn versus shed—third trial. By T. I. Mairs and N. G. Miller. Oct., 1905.
75. Forage and soiling experiments, 1904. By G. C. Watson and T. I. Mairs. Dec., 1905.
76. Variety tests of wheat, oats, and potatoes. By G. C. Watson and N. G. Miller. Feb., 1906.
77. Small fruits in 1905. By J. P. Pillsbury. Mar., 1906.
78. A test of commercial cultures for legumes. By G. C. Butz. July, 1906.
79. Alfalfa as a forage crop for Pennsylvania. By G. C. Watson. Sept., 1906.
80. A comparison of alfalfa meal and wheat bran for dairy cows. By T. I. Mairs. Oct., 1906.
81. Commercial feeding stuffs. By T. I. Mairs. Nov., 1906.
82. Winter wheat varieties. By J. H. Barron. Aug., 1907.
83. Methods of steer feeding: Stover versus silage; barn versus shed, cottonseed meal versus Ajax Flakes. By T. I. Mairs. Oct., 1907.
84. Feed as a source of energy. By H. P. Armsby. Dec., 1907.
85. Test of a mechanical cow milker. By T. I. Mairs. Jan., 1908.
86. Miscible oils: How to make them. By C. L. Penny. Mar., 1908.
87. Some poultry experiments. By T. I. Mairs. Aug., 1908.
88. Steer feeding experiments. By T. I. Mairs and W. H. Tomhave. Nov., 1908.
89. Shelter test experiment with Sumatra-type tobacco. By William Frear. Jan., 1909.
90. Soil fertility. By T. F. Hunt. Mar., 1909.
91. Orchard fertilization. By J. P. Stewart. Apr., 1909.
92. Concentrated lime-sulphur: Its properties, preparation, and use. By J. P. Stewart. July, 1909. See 99.
93. A study of Pennsylvania butter. By H. E. Van Norman and C. W. Larson. Aug., 1909.
94. Variety tests of wheat. By C. F. Noll. Aug., 1909.
95. Experiments in pig feeding: White middlings versus corn chop and tankege. By T. I. Mairs and S. W. Doty. Dec., 1909. Also revised edition.
96. A strain test of Jersey Wakefield cabbage. By C. E. Myers. Feb., 1910.
97. Milling and baking tests. By F. D. Gardner. Mar., 1910.
98. A variety test of potatoes. By C. P. Noll. Mar., 1910.
99. Preparation and use of concentrated lime-sulphur. By J. P. Stewart. May, 1910. Includes revision of parts of 92. See 115.
100. The fertilization of apple orchards. By J. P. Stewart. June, 1910. See 121.
101. Meadows and pastures. By T. F. Hunt. July, 1910.
102. Methods of fattening steers. By W. A. Cochel and S. W. Doty. Sept., 1910.
103. The lighting of farm houses. By I. T. Osmond. Sept., 1910.
104. The respiration calorimeter at the Institute of Animal Nutrition of the Pennsylvania State College. By H. P. Armsby. Oct., 1910.
105. Influence of type and of age upon the utilization of feed by cattle. By H. P. Armsby and J. A. Fries. Nov., 1910.
106. The apple in Pennsylvania: Varieties, planting, and general care. By J. P. Stewart. Dec., 1910. A revision of 43; see also 123.
107. Poultry experiments and management. By T. I. Mairs and H. W. Jackson. Dec. 1910.
108. Variety tests of oats. By F. D. Gardner and J. A. Runk. Feb., 1911.
109. Some soiling crops for Pennsylvania. By T. I. Mairs. Feb., 1911.
110. The control of insects and diseases affecting horticultural crops. By H. R. Fulton, W. J. Wright, and J. W. Gregg. Apr., 1911.
111. The maintenance ration of cattle. By H. P. Armsby. Aug., 1911.
112. Beef production in Pennsylvania. By W. A. Cochel. Nov., 1911.
113. Work of the agricultural experiment station for 1910-11. By W. Frear. Feb., 1912.
114. A short method of computing dairy rations according to the net energy standards. By H. E. Van Norman. Mar., 1912.
115. Preparation and use of the concentrated lime-sulphur spray. By J. F. Stewart. Mar., 1912. Supersedes 99.
116. Corn growing in the East. By T. F. Hunt. Apr., 1912.
117. Feeding draft horses. By W. A. Cochel. Aug., 1912.
118. Silage for steers; wintering beef-breeding cows. By W. A. Cochel. Oct., 1912.
119. Strain tests of cabbage. By C. E. Myers. Dec., 1912.
120. Poultry experiments: Experiments in incubation. By H. W. Jackson.—Crude fiber in the ration of laying hens. By W. A. Cochel and H. W. Jackson.—A comparison of simple rations with variety in feeding laying hens. By W. A. Cochel and H. W. Jackson. Dec., 1912.
121. The fertilization of apple orchards. By J. P. Stewart. Apr., 1912. Supersedes 100.
122. Developing draft colts. By W. A. Cochel and B. O. Severson. July, 1913.
123. The history of tuberculosis in the college herd. By H. H. Havner. Aug., 1913.
124. Steer feeding experiments. By W. H. Tomhave and B. O. Severson. Sept., 1913.
125. Variety tests of wheat. By C. F. Noll. Oct., 1913.
126. Food as body fuel. By H. P. Armsby. Nov., 1913.
127. Pennsylvania limestone and lime supplies. By William Frear. Dec., 1912.
128. The apple in Pennsylvania: Varieties, planting, and general care. By J. P. Stewart. Feb., 1914. A revision of 106.
129. Strain tests of tomatoes. By C. E. Myers. Mar., 1914.
130. Tobacco seed-beds. By Otto Olson. Apr., 1914.
131. The use of lime on land. By F. D. Gardner. Sept., 1914.
132. The soils of Pennsylvania. By C. F. Shaw. Oct., 1914.
133. Steer-feed experiments. By W. H. Tomhave and C. W. Hickman. Nov., 1914.
134. Experimental results in young orchards in Pennsylvania. By J. F. Stewart. Apr., 1915.
135. A study of the manufacture of dairy butter; methods of making farm butter. By E. L. Anthony. July, 1915.
136. Collar blight and related forms of fire blight. By C. R. Orton and J. F. Adams. Aug., 1915.
137. Experiments with cabbage. By C. E. Myers. Jan., 1916.
138. Raising beef cattle. By B. O. Severson. Mar., 1916.
139. Experiments with corn. By C. F. Noll. Apr., 1916.
140. Potato diseases. By C. R. Orton. May, 1916.

141. Cultural methods in bearing orchards. By J. P. Stewart. June, 1916.
142. Net energy values for ruminants. By H. P. Armsby and J. A. Fries.—Net energy values of American feeding stuffs. By H. P. Armsby and F. S. Putney. July, 1918.
143. Computation of dairy rations. By F. S. Putney and H. P. Armsby. Aug., 1916. Based on 114 and 142. See 161.
144. The maintenance of breeding ewes of mutton and wool sheep. By B. O. Severson. Oct., 1916.
145. Steer feeding experiments. By W. H. Tomhave, B. O. Severson, and Paul Gerlaugh. Apr., 1917.
146. Thirty-five years' results with fertilizers. By F. D. Gardner, C. F. Noll, and P. S. Baker. May, 1917.
147. Miscellaneous experiments, from the director's report, 1916-17. July, 1917.
148. Wheat. By C. F. Noll. Aug., 1917.
149. The relative value of limestone of different degrees of fineness for soil improvement. By J. W. White. Oct., 1917. See 152.
150. Raising beef cattle. By B. O. Severson. Jan., 1918.
151. Fertilizer experiments on DeKalb soils: A preliminary report. By J. W. White. Feb., 1918.
152. The relative value of limestone of different degrees of fineness for soil improvement. By J. W. White and F. D. Gardner. Mar., 1918. A popular edition of 149.
153. The fertilization of apple orchards. By J. P. Stewart. May, 1918.
154. A variety test of cabbage. By C. E. Myers and J. S. Gardner. Jan., 1919.
155. Fertilizer experiments on DeKalb soil: Yields of clover, corn, and Kentucky blue grass. By J. W. White. Feb., 1919.
156. The potato wart disease: A new and serious disease recently discovered in Pennsylvania. By C. R. Orton and F. D. Kern. Mar., 1919.
157. Cost of burning lime in the stack or heap. By William Frear and C. L. Goodling.—Supplementary report upon the limestone resources of Pennsylvania. By William Frear and C. A. Kern. Apr., 1919.
158. An economic study of the gas tractor in Pennsylvania. By D. S. Fox. May, 1919.
159. Dairy farming in southeastern Pennsylvania. By G. A. Billings. Sept., 1919.
160. Rusts on conifers in Pennsylvania. By J. F. Adams.—Sexual fusions and development of the sexual organs in the Peridermiums. By J. F. Adams. Dec., 1919.
161. Computation of dairy rations. [Revised by A. A. Borland from Bul. 143 by F. S. Putney and A. P. Armsby.] Mar., 1920.
162. The control of frog eye on apple. By R. C. Walton. May, 1920.
163. Cross breeding Delaine merino ewes with pure-bred mutton rams. By W. H. Tomhave and C. W. McDonald. May, 1920.
164. Lime requirement of Pennsylvania soils. (Summary of a lime requirement survey of Pennsylvania.) By J. W. White. July, 1920.

## BULLETINS OF INFORMATION.

1. The computation of rations for farm animals. By H. P. Armsby. Second edition, Dec., 1896.
2. Composition of full cream cheese. By William Frear. Sept., 1897.
3. Spray calendar. By G. C. Butz. Apr., 1902.

## PORTO RICO.

## Porto Rico Agricultural Experiment Station, Mayaguez.

## BULLETINS.

1. The agricultural experiment station of Porto Rico, its establishment, location, and purpose. By F. D. Gardner. Sept., 1902. Also Spanish edition.
2. The changa, or mole cricket (*Scaptomyza didactylus* Latr.) in Porto Rico. By O. W. Barrett. Sept., 1902. Also Spanish edition.
3. Soil survey from Arecibo to Ponce, Porto Rico. By C. W. Dorsey, L. Mesmer, and T. A. Caine. Sept., 1903. Also Spanish edition.
4. Propagation and marketing of oranges in Porto Rico. By H. C. Henricksen. May, 1904. Also Spanish edition.
5. Tobacco investigations in Porto Rico during 1903-4. By J. Van Leenhoff, jr. Dec., 1904. Also Spanish edition.
6. The yautias, or taniers of Porto Rico. By O. W. Barrett. Apr., 1905. Also Spanish edition.
7. Vegetable growing in Porto Rico. By H. C. Henricksen. Feb., 1906. Also Spanish edition.
8. Pine-apple growing in Porto Rico. By H. C. Henricksen and M. J. Iorns. Jan., 1909. (Issued Apr., 1909.) Also Spanish edition.
9. Sugar cane in Porto Rico. By D. W. May. Apr., 1910. Also Spanish edition.
10. Insects injurious to citrus fruits and methods for combating them. By W. V. Tower. Jan., 1911. Also Spanish edition.
11. Relation of calcareous soils to pineapple chlorosis. By P. L. Gile. May, 1911. Also Spanish edition.
12. Lime-magnesia ratio as influenced by concentration. By P. L. Gile. Sept., 1912.
13. Studies on acid soils of Porto Rico. By Oscar Loew. Oct., 1913.
14. The red clay soil of Porto Rico. By P. L. Gile and C. N. Ageton. Mar., 1914.
15. Porto Rican beekeeping. By E. F. Phillips. May, 1914. Also Spanish edition.
16. The effect of strongly calcareous soils on the growth and ash composition of certain plants. By P. L. Gile and C. N. Ageton. Sept., 1914.
17. Fungus diseases of coffee in Porto Rico. By G. L. Fawcett. Feb., 1915. Also Spanish edition.
18. Citrus fertilization experiments in Porto Rico. By C. F. Kinman. May, 1915. Also Spanish edition.
19. Cover crops for Porto Rico. By C. F. Kinman. Jan., 1916. Also Spanish edition.
20. Experiments on the supposed deterioration of varieties of vegetables in Porto Rico, with suggestions for seed preservation. By C. F. Kinman and T. B. McClelland. Nov., 1916. Also Spanish edition.
21. Some profitable and unprofitable coffee lands. By T. B. McClelland. Mar., 1917. Also Spanish edition.
22. Effect of different methods of transplanting coffee. By T. B. McClelland. June, 1917. Also Spanish edition.
23. The changa or West Indian mole cricket. By R. H. Van Zwaluwenburg. Feb., 1918.
24. The mango in Porto Rico. By C. F. Kinman. Feb., 1918.
25. The bat guanos of Porto Rico and their fertilizing value. By P. L. Gile and J. O. Carrero. July, 1918.
26. Vanilla: A promising new crop for Porto Rico. By T. B. McClelland. Apr., 1919.

## RHODE ISLAND.

## Rhode Island Agricultural Experiment Station, Kingston.

## BULLETINS.

1. Organization. By C. O. Flagg. Mar., 1889.
2. The farm: Historical, physical, and geological description. - By C. O. Flagg and E. F. Clark. June, 1889.
3. Stock feeding. By H. J. Wheeler. Sept., 1889.
4. Bee keeping: Establishment of the apiary. By Samuel Cushman. Dec., 1889.
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## SOUTH CAROLINA.

University of South Carolina Agricultural Experiment Station, Columbia.

## BULLETINS.

1. Tests of varieties of cotton. By J. M. McBryde. Apr., 1888.
2. Tests of commercial seeds. By R. H. Loughridge. May, 1888.
3. Analyses of fertilizers and feeding stuffs. By W. B. Burney and R. H. Loughridge. July, 1888.
4. Entomology. By G. F. Atkinson. Jan., 1889.
5. Oats and wheat. By J. M. McBryde. Apr., 1889.
6. Hog cholera. By W. B. Niles and B. M. Bolton. July, 1889.
7. Meteorological data, Nov., 1888-June, 1889. By Milton Whitney. Oct., 1889.
8. Chemical statistics of corn crop of South Carolina; maize fodder ensilage; cowpeas as a forage crop; composition of soja bean vines. By J. B. McBryde. Mar., 1890.

South Carolina Agricultural Experiment Station, Clemson College.

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1. Table of analyses of commercial fertilizers, season 1890-91, Part 1. July, 1891.
2. Cotton experiments with varieties and with fertilizers. By J. B. McBryde. July, 1891.
3. Table of analyses of commercial fertilizers, season 1890-91, Part 2. Oct., 1891.
4. Fertilizer tests with wheat; varieties of wheat and oats. By J. F. Duggar. Dec., 1891.
5. Methods of keeping sweet potatoes. By J. F. Duggar. July, 1892.
6. Analyses of commercial fertilizers. July, 1892.
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23. Lameness in horses and mules. By W. E. A. Wyman. Apr., 1896.
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71. New method of preserving [evaporating] sweet potatoes. By J. S. Newman and J. S. Pickett. May, 1902.
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<sup>15</sup> An agricultural experiment station was organized as a department of the University in 1882. Previous to the reorganization of the station in 1887, Bulletins 1-8, 1883-1886, were published.

- [2.] Vol. I, No. 2. The experiment station, building, and laboratories. By C. W. Dabney.—Germination of seed corn. By C. S. Plumb.—Analyses of commercial fertilizers, season of 1887-1888. July, 1888.
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- C. Treatment of certain fungous diseases of plants. By F. Lamson-Scribner. May, 1890.
- D. Potash and paying crops [compiled by A. de Ghequier]. July, 1890. Identical with Maryland Sta. Bul. [B]; Georgia Sta. Bul. 9; West Virginia Sta. Spec. Bul. [I].
- E. The cotton worm; the Hessian fly. By H. E. Summers. July, 1890.

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## Texas Agricultural Experiment Station, College Station.

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251. Commercial feeding stuffs, September 1, 1918, to August 31, 1919. By F. D. Fuller. Sept., 1919.
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261. Diseases of grains, sorghums, and millet, and their control in Texas. By J. J. Taubenhau. Apr., 1920.
262. The searing iron vs. the knife for docking or detailing lambs. By J. M. Jones and C. M. Hubbard. Apr., 1920.

263. Rations for fattening steers: Cottonseed meal versus peanut meal; cold pressed cottonseed versus ground whole pressed peanuts; sorghum silage versus cottonseed hulls. By J. C. Burns. Aug., 1920.
264. Farm records and accounts. By H. M. Eliot and H. B. Killough. May, 1920.
265. Commercial fertilizers in 1919-20. By G. S. Fraps and S. E. Asbury. Aug., 1920.
266. The staple of Texas cotton. By E. P. Humbert. Aug., 1920.
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269. Grain sorghum versus corn for fattening lambs. By J. M. Jones, R. A. Brewer, and R. E. Dickson. Oct., 1920.
270. A study of the black and the yellow molds of ear corn. By J. J. Taubenhaus. Oct., 1920.
271. The salt or sodium chloride content of feeds. By G. S. Fraps and S. Lomanitz. Oct., 1920.

## UTAH.

## Utah Agricultural Experiment Station, Logan.

## BULLETINS.

1. Investigations in progress at the station. By J. W. Sanborn. June, 1890.
2. Plow trials. By J. W. Sanborn. Nov., 1890.
3. Experiments with garden vegetables. By E. S. Richman. Jan., 1891.
4. Dynamometer tests with wagons. By J. W. Sanborn. Jan., 1891.
5. Potato trials. By J. W. Sanborn.—Experiments with potatoes. By E. S. Richman. Mar., 1891.
6. Trials of sleds and tillage tools. By J. W. Sanborn. May, 1891.
7. Draft of mowing machines. By J. W. Sanborn. July, 1891.
8. Ensilage. By J. W. Sanborn. Aug., 1891.
9. Time of watering horses; whole versus ground grain for horses. By J. W. Sanborn. Dec., 1891.
10. Experiments with strawberries, peas, and beans. By E. S. Richman. Dec., 1891.
11. Blanketing horses and cattle; sheltered versus unsheltered cattle; exercise versus non-exercise of stock. By J. W. Sanborn. Apr., 1892.
12. Experiments with garden vegetables. By E. S. Richman. Mar., 1892.
13. Feeding hay and grain mixed to horses; feeding cut hay vs. whole hay to horses. By J. W. Sanborn. May, 1892.
14. Horticulture and entomology. By E. S. Richman. June, 1892.
15. Soiling steers, or green versus dry food. By J. W. Sanborn. Aug., 1892.
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17. Feeding root crops versus dry food. By J. W. Sanborn. Oct., 1892.
18. Notes of forest and fruit trees. By E. S. Richman. Oct., 1892.
19. Feeding ensilage versus dry food. [By J. W. Sanborn.] Oct., 1892.
20. Horticultural department [experiments]; By E. S. Richman. Mar., 1893.
21. Feeding ruminants on grain alone; night versus day irrigation. [By J. W. Sanborn.] Mar., 1893.
22. Grass versus nongrass fed pigs; exercise versus nonexercise of pigs. By J. W. Sanborn.—Value of natural waters for crop growth. By W. P. Cutter. May, 1893.
23. Shelter of stock; exercise versus non-exercise of stock; early versus late irrigation. By J. W. Sanborn. July, 1893.
24. Irrigation. By J. W. Sanborn. Aug., 1893.
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31. Time to harvest lucerne; mulching. By J. W. Sanborn. June, 1894.
32. Roots and plants of farm crops. By J. W. Sanborn. June, 1894.
33. Grazing values of varieties of grass; drilling versus broadcasting grass seed. By J. W. Sanborn. June, 1894.
34. Relative value of wheat, peas, corn, and barley in the production of pork. By A. A. Mills. July, 1894.
35. Steer feeding: The value of straw and grain as a substitute for hay; short spring periods of grain feeding; relative value of ensilage, roots, and straw as condiments; value of different grain rations. By A. A. Mills. Aug., 1894.
36. Relative value of corn and oats for horses. By A. A. Mills. Sept., 1894.
37. Fruits and fruit trees; ornamental, forest, and shade trees. By E. S. Richman. Oct., 1894.
38. Preliminary report on seepage water and the underflow of rivers. By Samuel Fortier. Feb., 1895.
39. Farm irrigation. By A. A. Mills.—Orchard [and vineyard] irrigation. By E. S. Richman. May, 1895.
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43. Dairy herd record for 1894-95; winter feeding experiments with dairy cows; some suggestions on the building and equipment of factories. By F. B. Linfield. May, 1896.
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53. Utah sugar beets, 1897. By J. A. Widtsoe. Feb., 1898.
54. Cattle feeding; Comparison of Utah feeding stuffs. By Luther Foster and L. A. Merrill.—Digestion experiments with shredded corn-fodder, lucern, timothy, and wheat bran. By J. A. Widtsoe. Feb., 1898.
55. Orchard pests. By U. P. Hedrick. Mar., 1898.
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58. The chemical life history of lucern, Pt. II. By J. A. Woldtsoe and John Stewart. July, 1898.
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60. Poultry experiments. By James Dryden. Mar., 1899.
61. Alfalfa, or lucern: The cutting time; its feeding value. By Luther Foster and L. A. Merrill. Apr. 1899.
62. Tree planting in Utah. By U. P. Hedrick. May, 1899.
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71. Carrying capacities of irrigation canals. By Samuel Fortier. July, 1900.
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77. Horsefeeding. By L. A. Merrill. June, 1902.
78. Experiments in fattening lambs. By F. B. Linfield. Sept., 1902.
79. Process butter, a dairy fraud. By R. W. Clark and J. A. Crockett. Jan., 1903.
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81. Poison in water from a gold and silver mill. By P. A. Yoder. Feb., 1903.
82. Feeding beet pulp to steers and sheep. By R. W. Clark. July, 1903.
83. Pruning of tree and bush fruits. By W. N. Hutt. Oct., 1903.
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138. How to control the grasshoppers. By E. D. Ball. Feb., 1915.
139. The movement of soluble salts with the soil moisture. By F. S. Harris. May, 1915.
140. The summer pruning of a young bearing apple orchard. By L. D. Batchelor and W. E. Goodspeed. Nov., 1915.
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157. The irrigation of potatoes. By F. S. Harris. June, 1917.
158. Soil moisture studies under dry farming. By F. S. Harris and J. W. Jones. July, 1917.
159. Soil moisture studies under irrigation. By F. S. Harris and A. F. Bracken. July, 1917.
160. Important factors in the operation of irrigated Utah farms. By E. B. Brossard. Sept., 1917.
161. Orchard heating. By F. L. West and N. E. Edlefsen. Oct., 1917.
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163. Composition of the irrigation waters of Utah. By J. E. Greaves and C. T. Hirst. June, 1918.
164. Factors affecting the depth of sowing various crops. By F. S. Harris and H. J. Maughan. Sept., 1918.
165. Labor costs and seasonal distribution of labor on irrigated crops in Utah Valley. By L. G. Connor. Oct., 1918.
166. The climate of Utah. By F. L. West and N. E. Edlefsen. Mar., 1919.
167. The irrigation of oats. By F. S. Harris and D. W. Pittman. Mar., 1919.
168. Relative resistance of various crops to alkali. By F. S. Harris and D. W. Pittman. July, 1919.
169. The use of alkali water for irrigation. By F. S. Harris and N. I. Butt. July, 1919.
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172. The value of barnyard manure on Utah soils. By F. S. Harris. Mar., 1920.
173. The duty of water in Cache Valley, Utah. By F. S. Harris. Mar., 1920.
174. A variety survey and descriptive key of small grains in Utah. By George Stewart. May, 1920.
175. Sixteen years of dry-farm experiments in Utah. By F. S. Harris, A. F. Bracken, and I. J. Jensen. June, 1920.
176. Potato improvement by hill selection. By George Stewart. Nov., 1920.
177. Some types of irrigation farming in Utah. By E. B. Brossard. Dec., 1920.

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## Vermont Agricultural Experiment Station, Burlington.

## BULLETINS.

1. Analyses of commercial fertilizers. By W. W. Cooke. Mar. 31, 1887.
2. Analyses of fertilizers. By W. W. Cooke. June 20, 1887.
3. Analyses of bone meal. By W. W. Cooke. Aug., 1887.
4. [Feeding experiments with cowpea and seradella.] By W. W. Cooke. Nov. 22, 1887.
5. [Availability of nitrogen in fertilizers.] By W. W. Cooke. Jan. 23, 1888.
6. [Analyses of ashes, bone meal, and fertilizers.] By W. W. Cooke. Feb. 27, 1888.
7. [Conference on the Hatch act. Mar., 1888].
8. Analysis of fertilizers. By W. W. Cooke. Apr. 9, 1888.
9. Smut in oats, insecticides, and fertilizer analyses. By W. W. Cooke. Apr. 23, 1888.
10. New organization. By W. W. Cooke. May, 1888.
11. Cooperation in the study of insects; tent caterpillars. By G. H. Perkins. June, 1888.
12. Insecticides; seed tests; miscellaneous analyses. By W. W. Cooke. Aug., 1888.

13. Methods of cutting and planting potatoes; fertilizer analyses. By W. W. Cooke. Nov., 1888.
14. Analysis of fertilizers. By W. W. Cooke. Mar., 1889.
15. Effect of fertilizers on the composition of corn; analysis of hay. By W. W. Cooke. June, 1889
16. Testing milk at creameries. July, 1889.
17. Test of dairy cows at Vermont State Fair. By W. W. Cooke. Oct., 1889.
18. Pig feeding. By W. W. Cooke. Jan., 1890.
19. Questions concerning injurious insects. By G. H. Perkins. Apr., 1890.
20. Analyses of fertilizers. By W. W. Cooke. May, 1890.
21. A new milk test; testing milk at creameries and cheese factories; notes for the laboratory. Sept., 1890.
22. Test of dairy cows; home versus fair grounds. By J. L. Hills. Oct., 1890.
23. Analyses of fertilizers. By J. L. Hills. Mar., 1891.
24. Potato blight and rot. By L. R. Jones. May, 1891.
25. The bounty on maple sugar. By W. W. Cooke. [June, 1891].
26. Maple sugar. By W. W. Cooke and J. L. Hills. Sept., 1891.
27. Tests of dairy apparatus. By J. L. Hills. Jan., 1892.
28. Plant diseases: Potato blight and rot; a new potato disease; potato scab; apple and pear scab; oat smut. By L. R. Jones. Apr., 1892.
29. Analyses of fertilizers. By J. L. Hills. May, 1892.
30. Results of the bounty on maple sugar. By W. W. Cooke and J. L. Hills. June, 1892.
31. Feeding tests with sugar meal, cream gluten meal, and germ feed. By W. W. Cooke. Feb., 1893.
32. Oat smut. By L. R. Jones. Mar., 1893.
33. Record of the station herd for the year 1892. By W. W. Cooke. Apr., 1893.
34. Analyses of fertilizers. By J. L. Hills. Apr., 1893.
35. Analyses of fertilizers. By J. L. Hills. May, 1893.
36. Potato blights and their remedies. By L. R. Jones. 1893.
37. Annual report of the director, I. By W. W. Cooke. 1893.
38. Annual report of the director, II. By W. W. Cooke. 1893.
39. Annual report of the director, III. By W. W. Cooke. 1893.
40. Spraying potatoes. By L. R. Jones. Dec., 1893.
41. Analyses of commercial fertilizers. By J. L. Hills and B. O. White. Apr., 1894.
42. Bovine tuberculosis. By J. L. Hills and F. A. Rich. July, 1894.
43. Household pests: Buffalo beetle; clothes moths. By G. H. Perkins. Nov., 1894.
44. Spraying orchards and potato fields. By L. R. Jones. Dec., 1894.
45. Analyses of commercial fertilizers. By J. L. Hills and B. O. White. Mar., 1895.
46. Analyses of commercial fertilizers. By J. L. Hills and B. O. White. Apr., 1895.
47. Commercial fertilizers. By J. L. Hills and B. O. White. May, 1895.
48. Gluten feeds and meals. By J. L. Hills. Oct., 1895.
49. Potato blights and fungicides. By L. R. Jones. Dec., 1895.
50. Analyses of commercial fertilizers. By J. L. Hills and B. O. White. Mar., 1896.
51. Analyses of commercial fertilizers. By J. L. Hills and B. O. White. Apr., 1896.
52. Analyses of commercial fertilizers. By J. L. Hills, B. O. White, and C. H. Jones. May, 1896.
53. The pollination of plums. By F. A. Waugh. Aug., 1896.
54. Salad plants and plant salads. By F. A. Waugh. Nov., 1896.
55. Apple growing in Grand Isle County. By F. A. Waugh. Dec., 1896.
56. Orange hawkweed, or "paint brush." By L. R. Jones and W. A. Orton. Feb., 1897.
57. Analyses of commercial fertilizers. By J. L. Hills, B. O. White, and C. H. Jones. Mar., 1897.
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60. Insects of the year. By G. H. Perkins. Oct., 1897.
61. Hardy apples for cold climates. By F. A. Waugh. Nov., 1897.
62. Home-grown grapes in Vermont. By F. A. Waugh. Jan., 1898.
63. Analyses of commercial fertilizers. By J. L. Hills, B. O. White, and C. H. Jones. Mar., 1898.
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65. Analyses of commercial fertilizers. By J. L. Hills, B. O. White, and C. H. Jones. May, 1898.
66. Chub root and black rot, two diseases of the cabbage and turnip. By L. R. Jones. Sept., 1898.
67. Hybrid plums. By F. A. Waugh. Dec., 1898.
68. Inspection of milk tests and feeding stuffs. By J. L. Hills. Jan., 1899.
69. Analyses of commercial fertilizers. By J. L. Hills, C. H. Jones, and B. O. White. Mar., 1899.
70. Analyses of commercial fertilizers. By J. L. Hills, C. H. Jones, and B. O. White. Apr., 1899.
71. Analyses of commercial fertilizers. By J. L. Hills, C. H. Jones, and B. O. White. May, 1899.
72. Certain potato diseases and their remedies. By L. R. Jones. Sept., 1899. A summary of all station work on the subject previously published.
73. The trees of Vermont. By Anna M. Clark. Oct., 1899. See 194.
74. The home fruit garden: The beginning, the planting, the tending. By F. A. Waugh. Dec., 1899.
75. Check list of hybrid plums. By F. A. Waugh. Jan., 1900.
76. The forest caterpillar (*Climacampa disstria* Hub.). By G. H. Perkins. Mar., 1900.
77. Analyses of commercial fertilizers. By J. L. Hills, C. H. Jones, and B. O. White. Apr., 1900.
78. Analyses of commercial feeding stuffs. By J. L. Hills, C. H. Jones, and B. O. White. Apr., 1900.
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80. Analyses of commercial fertilizers. By J. L. Hills, C. H. Jones, and B. O. White. May, 1900.
81. Principles and practice of stock feeding. By J. L. Hills. Sept., 1900. See also 152.
82. Analyses of commercial feeding stuffs. By J. L. Hills, C. H. Jones, and B. O. White. Sept., 1900.
83. Apples of the Fameuse type. By F. A. Waugh. Dec., 1900.
84. Analyses of commercial feeding stuffs. By J. L. Hills, C. H. Jones, and B. O. White. Jan., 1901.
85. Potato scab and its prevention. By L. R. Jones and A. W. Edson. Feb., 1901.
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88. Analyses of commercial feeding stuffs. By J. L. Hills, C. H. Jones, and B. O. White. Oct., 1901.
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92. Analyses of commercial fertilizers. By J. L. Hills, C. H. Jones, and B. O. White. Apr., 1902.
93. Commercial fertilizers: Formulas for home mixtures. By J. L. Hills, C. H. Jones, and B. O. White. May, 1902.
94. Vermont grasses and clovers. By L. R. Jones. May, 1902.
95. A poisonous plant: The common horsetail (*Equisetum arvense*). By F. A. Rich and L. R. Jones. June, 1902.
96. Apple pomace a good feed for cows. By J. L. Hills. Sept., 1902.
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102. The measurement of saw logs. By A. L. Daniels. Oct., 1903. Also revised edition.
103. The maple sap flow. By C. H. Jones, A. W. Edson, and W. J. Morse. Dec., 1903. See 105.
104. Commercial feeding stuffs. By J. L. Hills, C. H. Jones, and F. M. Hollister. Dec., 1903.
105. The maple sap flow. By J. L. Hills. Feb., 1904. A popular edition of 103.
106. Abstract of sixteenth annual report, 1902-3. By J. L. Hills. Mar., 1904.
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112. Commercial fertilizers. By J. L. Hills, C. H. Jones, and F. M. Hollister. Apr., 1905.
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114. Alfalfa in Vermont. By J. L. Hills and L. R. Jones. Apr., 1905.
115. Disease-resistant potatoes. By William Stuart. May, 1905.
116. Commercial fertilizers: How, when, and what to use. By J. L. Hills, C. H. Jones, and F. M. Hollister. June, 1905.
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121. Commercial fertilizers. By J. L. Hills and C. H. Jones. Mar., 1906.
122. Disease resistance of potatoes. By William Stuart. Apr., 1906.
123. Commercial fertilizers: Concerning the purchase of plant food; the moisture relations of the soil. By J. L. Hills and C. H. Jones. June, 1906. See also 173, 182, 198.
124. Commercial feeding stuffs. By J. L. Hills and C. H. Jones. Sept., 1906.
125. Commercial feeding stuffs. By J. L. Hills and C. H. Jones. Dec., 1906.
126. Commercial fertilizers. By J. L. Hills and C. H. Jones. Mar., 1907.
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128. The testing of cows. By J. L. Hills. Apr., 1907.
129. Abstract of nineteenth annual report, 1905-1906. By J. L. Hills [and others]. Apr., 1907.
130. Commercial fertilizers; soil biology in its relation to fertilization. By J. L. Hills and C. H. Jones. June, 1907.
131. Commercial feeding stuffs. By J. L. Hills and C. H. Jones. Sept., 1907.
132. Forest planting in Vermont. By L. R. Jones and C. R. Pettis. Jan., 1908.
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134. Commercial fertilizers. By J. L. Hills and C. H. Jones. Mar., 1908.
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136. Abstract, twentieth report, 1907: Plant diseases, horticulture, weeds, insects. By J. L. Hills. June, 1908.
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138. Commercial feeding stuffs; the viability of weed seeds in feeding stuffs. By J. L. Hills, C. H. Jones, and C. L. Beach. Jan., 1909.
139. Preliminary statement regarding the forestry problems of Vermont. By A. F. Hawes. Mar., 1909.
140. Commercial fertilizers. By J. L. Hills, C. H. Jones, and H. L. Miner. Mar., 1909.
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142. Plant diseases; potato spraying. By L. R. Jones and N. J. Giddings. May, 1909.
143. Commercial fertilizers; the service of a fertilizer control; soil physiography. By J. L. Hills, C. H. Jones, and H. L. Miner. June, 1909.
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145. Vermont shrubs and woody vines. By L. R. Jones and F. V. Rand. Oct., 1909.
146. The grass and clover seed trade in Vermont in 1907-1909. By G. T. Harrington. Nov., 1909.
147. The bacterial soft rots of certain vegetables: The mutual relationships of the casual organisms. By H. A. Harding and W. J. Morse.—Pectinase, the cytolytic enzyme produced by *Bacillus carotovorus* and certain other soft-rot organisms. By L. R. Jones. Dec., 1909.
148. A bacterial soft rot of muskmelon caused by *Bacillus melonis* n. sp. By N. J. Giddings. Jan., 1910.
149. A practical method for killing witch grass. By A. J. Eaton and H. A. Edson. Jan., 1910.
150. The rôle of anesthetics and other agents in plant forcing. By William Stuart. Mar., 1910.
151. "Buddy sap": A preliminary report upon the microorganisms occurring in maple sap and their influence upon the quality of syrup. By H. A. Edson. Apr., 1910.
152. Commercial feeding stuffs; principles and practice of stock feeding. By J. L. Hills, C. H. Jones, and P. A. Benedict. Apr., 1910. Article on stock feeding is revised from 81.
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155. Principles and practice of ice cream making. By R. M. Washburn. Sept., 1910.
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202. "Mony meikles mak a muckle": II: The relation of the milk-vein system to production. By A. W. Aldrich and J. W. Dana.—The cost of production of milk and butterfat in 1911 and 1912. By G. M. Nelson.—The effect of the sire on the herd. By J. H. Wilson.—Concerning the Burlington milk supply. By J. E. Carrigan and W. T. Abell. Mar., 1917.
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215. Resistance of potato tubers to scab. By B. F. Lutman. June, 1919.
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## SUMMARIES.

Condensed outlines of articles published in Reports 1-19, Bulletins 1-133, 1887-1907. (Vermont Sta. Rpt., 20 (1906-07), p. 387-505.) Summaries arranged by topics with references to original publication.

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## Virginia Agricultural Experiment Station, Blacksburg.

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3. Steer feeding. By D. O. Nourse.—Meteorological record. By W. H. Reynolds. Nov., 1889.
4. Field tests with tomatoes; chemical composition of tomatoes. By W. B. Alwood and Walker Bowman. Jan., 1890.
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6. Variety tests with potatoes. By W. B. Alwood and R. H. Price. Mar., 1890.
7. Variety tests with strawberries. By W. B. Alwood. July, 1890.
8. Potato tests. By W. B. Alwood. Jan., 1891.
9. Tomatoes: Cultural and variety work. By W. B. Alwood.—Chemical examination of fruits. By Walker Bowman. Feb., 1891. Also abridged edition.
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11. Vegetables. By W. B. Alwood. Oct., 1891.
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30. Grape culture. By W. B. Alwood. July, 1893. Superseded by 94.
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204. The management of blue-grass pastures. By Lyman Carrier and R. A. Oakley. Feb., 1914.
205. Summary of ten years' experiments with tobacco. By E. H. Mathewson. June, 1914.
206. Experiments with dark tobacco. By B. G. Anderson. June, 1914.
207. Alfalfa experiments. By Lyman Carrier, E. R. Hodgson, R. P. Cocke, and B. G. Anderson. June, 1914.
208. Preparation of nicotine extracts on the farm. By W. B. Ellett and J. T. Grissom. July, 1914.
209. The frog-eye leaf spot of apples. By C. H. Crabill. Dec., 1915.
210. A stone-fruit spray made from hydrated lime and sulphur. By G. C. Starcher. Mar., 1916.
211. Effects of binders upon the melting and hardness of ice cream. By C. W. Holdaway and R. R. Reynolds. June, 1916.
212. Sudan grass. By T. B. Hutcheson, E. R. Hodgson, and T. K. Wolfe. Nov., 1916.
213. Spraying and dusting tomatoes. By F. D. Fromme and H. E. Thomas. Dec., 1916.
214. Corn culture. By T. B. Hutcheson, E. R. Hodgson, and T. K. Wolfe. Mar., 1917.

215. Wintering two-year-old steers preparatory to finishing on grass the following summer. By R. E. Hunt. Aug., 1917.
216. Wheat culture. By T. B. Hutcheson and T. K. Wolfe. Sept., 1917.
217. Potato culture. By T. B. Hutcheson and T. K. Wolfe. Dec., 1917.
218. Peanut culture. By E. T. Batten. Jan., 1918.
219. Wintering dairy heifers. By R. E. Hunt. Apr., 1918.
220. Bean rust: Its control through the use of resistant varieties. By F. D. Fromme and S. A. Wingard. Nov., 1918.
221. Fertilizers and their relation to crop production in Virginia. By T. B. Hutcheson and T. K. Wolfe. Mar., 1919.
222. The nematode disease of wheat in Virginia. By F. D. Fromme. Aug., 1919.
223. Dusting experiments in peach and apple orchards. By F. D. Fromme and G. S. Ralston. Nov., 1919.

## TECHNICAL BULLETINS.

- 1 The effect of association of legumes and nonlegumes. By W. B. Ellett, H. H. Hill, and W. G. Harris. Apr., 1915. Reprinted from Ann. Rpt. 1913-1914.
2. Notes on plant diseases in Virginia observed in 1913 and 1914. By H. S. Reed and C. H. Crabill. Apr., 1915. Reprinted from Ann. Rpt. 1913-1914.
3. Nitrogen fixation and nitrification in various soil types. By H. S. Reed and Bruce Williams. Apr., 1915. Reprinted from Ann. Rpt. 1913-1914.
4. The effect of some organic soil constituents upon nitrogen fixation by azotobacter. By H. S. Reed and Bruce Williams. Apr., 1915. Reprinted from Ann. Rpt. 1913-1914.
5. Some effects of pruning, root pruning, ringing, and stripping on the formation of fruit buds on dwarf apple trees. By A. W. Drinkard, jr. Apr., 1915. Reprinted from Ann. Rpt. 1913-1914.
6. The effect of green manuring on soil nitrates under greenhouse conditions. By H. H. Hill. Apr., 1915. Reprinted from Ann. Rpt. 1913-1914.
7. Smoothness and keeping qualities in ice cream, as affected by solids. By W. K. Brainerd. Apr., 1915. Reprinted from Ann. Rpt. 1913-1914.
8. The amount of arsenic in solution when lead arsenate is added to different spray solutions. By W. B. Ellett and J. T. Grissom. Apr., 1915. Reprinted from Ann. Rpt. 1913-1914.
9. The cedar rust disease of apples caused by *Gymnosporangium juniperi virginianae* Schw. By H. S. Reed and C. H. Crabill. May, 1915.
10. Some effects of temperature upon the growth and activity of bacteria in milk. By H. S. Reed and R. R. Reynolds. Mar., 1916.
11. North American varieties of the strawberry, with a bibliography of North American literature of the strawberry. By S. W. Fletcher. Aug., 1916.
12. The effects of high protein and high energy rations in feeding dairy cows. By W. B. Ellett and C. W. Holdaway. June, 1917. Reprinted from Ann. Rpt. 1914-1916.
13. A ten-year study of the effect of fertilizers on the soluble plant food in the soil and on the crop yield. By W. B. Ellett and H. H. Hill. June, 1917. Reprinted from Ann. Rpt. 1914-1916.
14. Effect of soil moisture on growth and maturity in maize. By T. B. Hutcheson and T. K. Wolfe. June, 1917. Reprinted from Ann. Rpt. 1914-1916.
15. The effect of different plant tissues on the fixation of atmospheric nitrogen; a study of the bacteriology of fresh and decomposing manure. By T. J. Murray. June, 1917. Reprinted from Ann. Rpt. 1914-1916.
16. Pot experiments to determine primarily the availability of phosphoric acid in Thomas slag phosphates in comparison with other phosphates. By W. B. Ellett and A. A. Ingham. June, 1917. Reprinted from Ann. Rpt. 1914-1916.
17. Further observations on the effects of pruning, root pruning, ringing, and stripping on the formation of fruit buds on dwarf apple trees. By A. W. Drinkard, jr.—Studies on methods of protecting ringing wounds on apple trees to promote their healing. By A. W. Drinkard, jr., and A. A. Ingham. June, 1917. Reprinted from Ann. Rpt. 1914-1916.
18. The effect of hybridization on maturity and yield in corn. By T. B. Hutcheson and T. K. Wolfe. June, 1917. Reprinted from Ann. Rpt. 1914-1916.
19. A comparison of methods for determining soil acidity and a study of the effects of green manures on soil acidity. By H. H. Hill. Apr., 1919.
20. The effects of high protein and high energy rations in feeding dairy cows. By W. B. Ellett and C. W. Holdaway. June, 1920.

## WASHINGTON.

## Washington Agricultural Experiment Station, Pullman.

## BULLETINS.

1. Announcements. By George Lilley. Dec., 1891.
2. Report of farmers' institute held at Colton, Wash., Jan. 30, 1892. [By George Lilley and others.] 1892.
3. Report of farmers' institute held at Garfield, Wash., Feb. 20, 1892. [By George Lilley and others.] 1892.
4. Wireworms. By J. O'B. Scobey. May, 1892.
5. Report of farmers' institute held at Pomeroy, Wash., May 15, 1892. [By George Lilley and others.] 1892.
6. Horticultural information. By E. R. Lake. Oct., 1892.
7. Two injurious insects. By C. V. Piper. Jan., 1893.
8. Common fungus diseases and methods of prevention; dodder. By C. V. Piper. June, 1893.
9. Sugar beets. By Elton Fulmer. [1893?] See also Popular Bul. 105.
10. Agricultural notes: Wheats, barleys, oats, peas, and forage crops. By E. R. Lake.—Review of the weather and crops in Washington for 1893. By H. F. Alciatore. Dec., 1893.
11. Preliminary report of a feeding test with swine. By E. R. Lake. Feb., 1894.
12. Forest-tree plantation. By J. A. Balmer. 1894.
13. Washington soils. By Elton Fulmer and C. C. Fletcher. 1894. Also Popular Bul. 7.
14. Silos and ensilage. By W. J. Spillman. Nov., 1894.
15. Sugar beets in Washington. By Elton Fulmer. [1894?] See also Popular Bul. 105.
16. Feeding wheat to hogs. By W. J. Spillman. Mar., 1895.
17. Insect pests of the garden, farm, and orchard. By C. V. Piper. 1895.
18. The Babcock milk test. By W. J. Spillman. Aug., 1895.
19. Vegetables: Notes on the crops of 1895. By J. A. Balmer. 1896.
20. Fiber flax in Washington. By A. W. Thornton. 1896.
21. Susceptibility of spermatophytes to pathogenic bacteria. By A. B. Kibbe. 1896.

22. Influenza. By S. B. Nelson. Oct., 1896.
23. Some notes concerning the nitrogen content of soils and humus. By Elton Fulmer, Oct., 1896.
24. The acid test for milk and cream. By W. J. Spillman. Oct., 1896.
26. [i. e., 25]. Pruning orchard trees. By J. A. Balmer. Dec., 1896.
26. Experiments in the culture of the sugar beet in Washington for 1895 and 1896. By Elton Fulmer. Dec., 1896. Also Popular Bul. 105.
27. A few facts about insects. By R. W. Doane. Jan., 1897.
28. Clearing land. By F. A. Huntley. Jan., 1897.
29. Rational stock feeding. By W. J. Spillman. Dec., 1896. See also 43.
30. A report on damage to fruit trees caused by the severe freeze of November 26-28, 1896. By J. A. Balmer. Dec., 1897.
31. Irrigation experiments in sugar-beet culture in the Yakima Valley. By Elton Fulmer. Dec., 1897. Also Popular Bul. 105.
32. Correction of Babcock test for cream; effect of richness of cream on acid test. By W. J. Spillman. [1897?]
33. Fiber flax investigations. By F. A. Huntley. May, 1898.
34. The Russian thistle in Washington. By C. V. Piper. May, 1898.
35. Miscellaneous injurious insects. By C. V. Piper and R. W. Doane. May, 1898.
36. Insects injurious to currants and gooseberries. By C. V. Piper and R. W. Doane. May, 1898.
37. The present status of the Russian thistle in Washington. By C. V. Piper. Oct., 1898.
38. Prunes. By J. A. Balmer. May, 1899.
39. The improvement of country roads. By W. J. Roberts. Nov., 1899.
40. Fertilizers: Principles underlying the use of fertilizers. By Elton Fulmer.—Sources and composition of fertilizers. By W. J. Heileman. Fertilizer law of Washington. Dec., 1899.
41. Forage plants in Washington. By W. J. Spillman. 1900.
42. A new sugar-beet pest and other insects attacking the beet. By R. W. Doane. 1900
43. Rational stock feeding. By W. J. Spillman. 1900. A revision of 29.
44. Fish scrap fertilizers. By W. H. Heileman. 1900.
45. A preliminary report of poison parsnip in western Washington. By D. A. Brodie. 1901.
46. Potato blight and its treatment. By D. A. Brodie. 1901.
47. The variegated cutworm. By R. W. Doane and D. A. Brodie. 1901.
48. A mechanical ration computer. By W. J. Spillman. 1901.
49. Alkali and alkali soils. By W. H. Heileman. 1901.
50. A preliminary report on glanders. By S. B. Nelson. 1902.
51. Locating orchards in Washington. By S. W. Fletcher. 1902.
52. Planting orchards in Washington. By S. W. Fletcher. 1902.
53. Nursery stock for Washington orchards. By S. W. Fletcher. 1902.
54. The formalin treatment for wheat and oat smut. By R. K. Beattie. 1902.
55. Washington soils. By Elton Fulmer. 1902. Also Popular Bul. 7.
56. Spraying for the San José scale with modifications of the sulphur-salt-lime wash. By C. V. Piper.—Chemical notes on the sulphur-salt-lime wash. By R. W. Thatcher. 1903.
57. Home vegetable garden in the Palouse country. By S. W. Fletcher. 1903.
58. Experiments in feeding swine. By E. E. Elliott. 1903.
59. Root diseases of fruit and other trees caused by toadstools: Root rot caused by *Armillaria mellea*: root disease caused by *Armillaria mellea* var. By C. V. Piper and S. W. Fletcher. 1903.
60. A report on the range conditions of central Washington. By J. S. Cotton. 1904.
61. A report on irrigation conditions in the Yakima Valley, Washington. By O. L. Waller. 1904.
62. The raspberry cane maggot. By W. H. Lawrence. 1904.
63. The raspberry root borer or the blackberry crown borer. By W. H. Lawrence. 1904.
64. The apple scab in western Washington. By W. H. Lawrence. 1904.
65. Three common insect pests of western Washington: The oyster-shell bark louse; the woolly aphid of the apple; the pear and cherry slug. By W. H. Lawrence. 1904.
66. Blackspot canker. By W. H. Lawrence. 1904.
67. Some notes concerning Halphen's test for cottonseed oil; reaction of lard from cottonseed-meal-fed hogs with Halphen's reagent; effects of feeding cottonseed meal upon the health of animals. By Elton Fulmer. 1905.
68. The wormy apple. By A. L. Melander. 1905.
69. Preliminary report on the codling moth in the Yakima Valley. By E. L. Jenne. 1905.
70. The powdery mildews of Washington. By W. H. Lawrence. 1905.
71. Preserving eggs. By R. W. Thatcher. 1905. Also Popular Buls. 54 and 114.
72. The chemical composition of Washington forage crops. (First report.) By R. W. Thatcher. 1905.
73. Feeding wild plants to sheep. By S. B. Nelson. 1906.
74. Two insect pests of the elm. By A. L. Melander. 1906.
75. Apple scab in eastern Washington. By W. H. Lawrence. 1906.
76. Economical preparation of the sulphur-lime spray. By R. W. Thatcher. 1906.
77. The codling moth in the Yakima Valley. By A. L. Melander and E. L. Jenne. 1906. Also Popular Bul. 5.
78. The goat industry in western Washington. By D. A. Brodie. 1906.
79. Steer feeding under eastern Washington conditions. By E. E. Elliott and W. A. Linklater. 1906.
80. Growing alfalfa without irrigation in Washington. By E. E. Elliott. 1907.
81. The codling moth in eastern Washington. By A. L. Melander and E. L. Jenne. 1907. Also Popular Bul. 5.
82. The chemical composition of Washington forage crops, second report; analyses of grains and concentrated feeding stuffs. By R. W. Thatcher.—Appendix: The State feeding law. 1907.
83. Some important plant diseases of Washington. By W. H. Lawrence. 1907.
84. Wheat and flour investigations (crop of 1905). By R. W. Thatcher. 1907. Also Popular Bul. 6.
85. Washington soils. By R. W. Thatcher. 1908. Also Popular Bul. 7.
86. The codling moth in 1907. By A. L. Melander and R. E. Trumble. 1908. Also Popular Bul. 5.
87. Raspberries, blackberries, and loganberries in Washington. By W. S. Thornber. 1909. Also Popular Bul. 18.
88. Lime as a fertilizer. By R. W. Thatcher.—Farm practice in applying land plaster in western Oregon and western Washington. By Byron Hunter. 1909. Also Popular Bul. 19.
89. The hybrid wheats. By W. J. Spillman. 1909. Also Popular Bul. 21.
90. Forest, shade, and ornamental trees in Washington. By W. S. Thornber. 1909.
91. Wheat and flour investigations (crops of 1906-7). By R. W. Thatcher. 1910. See also Popular Bul. 29.
92. Cherries in Washington. By W. S. Thornber. 1910.
93. A preliminary report of some experiments in clearing logged-off land with a stump burner; a promising method for destroying stumps and logs. By W. H. Lawrence. 1910.
94. Potato investigations. By A. G. Craig. 1910.

95. Chou moellier or marrow cabbage. By W. H. Lawrence. 1910.
96. Hatching and rearing of turkeys by artificial methods. By H. L. Blanchard. 1910.
97. Anthracnose of the blackberry and raspberry. By W. H. Lawrence. 1910.
98. Commercial fertilizers. By Elton Fulmer. 1911. See also Popular Bul. 37.
99. Field pea production in Washington. By M. W. Evans. 1911.
100. Wheat and flour investigations: Analyses and tests of crops of 1908 and 1909. By R. W. Thatcher, G. A. Olson, and W. L. Hadlock.—The composition and milling quality of Washington wheats. By R. W. Thatcher.—A simple apparatus for determining the milling qualities of wheats. By G. A. Olson. 1911. See also Popular Bul. 39.
101. Methods of clearing logged-off lands. By H. W. Sparks. 1911. See also Popular Bul. 40.
102. Wheat and flour investigations: A basis for selection of desirable seed for breeding for improvement of nitrogen content; the distribution of nitrogen in different parts of a wheat spike. By R. W. Thatcher. 1911.
103. The control of the codling moth. By A. L. Melander. Dec., 1911.
104. Twenty-first annual report for the year ending June 30, 1911. By R. W. Thatcher. Dec., 1911.
105. The nitrogen and humus problem in dry farming. By R. W. Thatcher. June, 1912.
106. The penetration system of orchard spraying. By A. L. Melander and R. K. Beattie. Jan., 1915.
107. Plant diseases induced by *Sclerotinia perplexa* nov. sp. By W. H. Lawrence. Oct., 1912.
108. Bluestem of the black raspberry. By W. H. Lawrence. Oct., 1912.
109. Twenty-second annual report for the year ending June 30, 1912. [By R. W. Thatcher.] Dec., 1912.
110. Commercial fertilizers. By Elton Fulmer. Jan., 1913.
111. A report of the investigations concerning the chemical composition of wheat, 1906 to 1912, inclusive. By R. W. Thatcher. Sept., 1913. See also Popular Bul. 68.
112. A preliminary report on the investigations of bovine red water (cystic hematuria) in Washington. By J. W. Kalkus. Oct., 1913.
113. Plants used for food by sheep on the Mica mountain summer range. By R. K. Beattie. Dec., 1913.
114. Tuberculosis: A report of the results of the continued injections of tuberculin upon tubercular cattle. By S. B. Nelson. Oct., 1914.
115. Studies on the relation of certain species of *Fusarium* to the tomato blight of the Pacific northwest. By H. B. Humphrey. Oct., 1914.
116. The quantitative determinations of mono-, di-, and tri-calcium phosphates and their application. By G. A. Olson. Oct. 3, 1914.
117. Report on fires occurring in threshing separators in eastern Washington during the summer of 1914. By I. D. Cardiff [and others]. Nov. 3, 1914.
118. Twenty-fourth annual report for the year ending June 30, 1914. [By I. D. Cardiff.] Nov., 1914.
119. First annual report, department of dryland demonstration and experiment for the year ending Dec. 31, 1914. [By I. D. Cardiff.] Jan., 1915.
120. First annual report, bureau of farm development for the year ending December 31, 1914. [By I. D. Cardiff.] Jan., 1915.
121. Washington wheats. By E. G. Schafer and E. F. Gaines. Feb., 1915.
122. A study of grazing conditions in the Wenaha National Forest. By H. T. Darlington. May, 1915.
123. Time and method of tillage on the yield and comparative cost of production of wheat in the Palouse region of eastern Washington. By C. C. Thom and H. F. Holtz. July, 1915.
124. Bud weevils and other bud-eating insects of Washington. By M. A. Yothers. Feb., 1916.
125. Preliminary note on leaf-invasions by *Bacillus amylovorus*. By F. D. Heald. Sept., 1915.
126. Bunt or stinking smut of wheat. By F. D. Heald and H. M. Woolman. Nov., 1915.
127. Twenty-fifth annual report for the year ending June 30, 1915. [By I. D. Cardiff.] Dec., 1915.
128. Forage crops in central Washington. By M. A. McCall. Jan., 1916.
129. Oats in Washington. By E. G. Schafer and E. F. Gaines. Mar., 1916.
130. The dipterous family Scatopsidae. By A. L. Melander. Apr., 1916.
131. Evaporation of apples. By J. S. Caldwell. May, 1916. See 148.
132. Isolation and cultivation of *Bacterium tuberculosis* on a synthetic culture medium. By C. A. Magoon. May, 1916.
133. A soil survey of the proposed Palouse irrigation project. By H. F. Holtz. Nov., 1916.
134. Sheep husbandry in the Pacific northwest. By William Hislop and C. E. Howell. Jan., 1917.
135. Inheritance in wheat, barley, and oat hybrids. By E. F. Gaines. Mar., 1917.
136. Twenty-sixth annual report for the year ending June 30, 1916. [By I. D. Cardiff.] Jan., 1917.
137. The coulee cricket (*Pranabrus scabricollis* Thomas): General discussion and photographs. By A. L. Melander.—Miscellaneous notes on the biology of the coulee cricket. By A. L. Yothers. Jan., 1917.
138. Adams branch experiment station: First annual report for the year ending June 30, 1916. [By M. A. McCall.] Feb., 1917.
139. Microchemical studies in the progressive development of the wheat plant. By Sophia H. Eckerson. Mar., 1917.
140. Field pea production. By E. G. Schafer and E. F. Gaines. Mar., 1917.
141. Barley in Washington. By E. G. Schafer and E. F. Gaines. Mar., 1917.
142. Gluten formation in the wheat kernel. By G. A. Olson. Mar., 1917.
143. The dipterous families Sepsidae and Piophilidae. By A. L. Melander and Anthony Spuler. Apr., 1917.
144. Wheat and flour investigations, V. By G. A. Olson. Mar., 1917.
145. The estimation of sulfur in plant material and soil. By G. A. Olson. Apr., 1917.
146. Factors influencing the water requirements of plants. By C. C. Thom and H. F. Holtz. June, 1917.
147. A new method for the preparation of pectin. By J. S. Caldwell. Apr., 1917.
148. The evaporation of fruits and vegetables. By J. S. Caldwell. June, 1917. Includes a revision of 131 and Popular Bul. 102.
149. Preparation and use of pure cultures for legume inoculation. By C. A. Magoon and B. F. Dana. Apr., 1918.
150. Studies on the morphology of wheat. By G. H. Jensen. Mar., 1918.
151. The wind dissemination of the spores of bunt or stinking smut of wheat. By F. D. Heald and D. C. George. Dec., 1918.
152. Not published.
153. Twenty-eighth annual report for the year ending June 30, 1918. [By George Severance.] Jan., 1919.
154. Sugar beets under irrigation in Washington. By F. J. Sievers and E. G. Schafer. Mar., 1919.
155. Twenty-ninth annual report for the year ending June 30, 1919. [By E. C. Johnson and others.] Mar., 1920.
156. A study of goitre and associated conditions in domestic animals. By J. W. Kalkus. July, 1920.
157. Pea straw for fattening beef cattle. By Howard Hackedorn and Jerry Sotola. Sept., 1920.
158. Thirtieth annual report for the year ending June 30, 1920. [By E. C. Johnson and others.] Nov., 1920.



## POPULAR BULLETINS.

1. Announcements. By R. W. Thatcher. Jan., 1908.
2. The sulphur-lime wash. By A. L. Melander. Jan., 1908. See 28.
3. Pruning fruit trees. By W. S. Thornber. Feb., 1908.
4. Notes on swine management. By W. A. Linklater. Mar., 1908.
5. Spraying for the codling moth. By A. L. Melander. Mar., 1908.
6. The milling quality of Washington wheat, I. By R. W. Thatcher. May, 1908.
7. Summary of the soil survey of the State. By R. W. Thatcher. June, 1908.
8. Orchard cover crops. By W. S. Thornber. July, 1908.
9. Some new hybrid wheats. By E. E. Elliott and C. W. Lawrence. Aug., 1908.
10. The construction and filling of silos. By W. A. Linklater. Sept., 1908.
11. Commercial potato growing. By A. G. Craig. Oct., 1908.
12. The care of milk on the farm. By I. P. Whitney. Nov., 1908.
13. Spraying calendar for 1909. By R. K. Beattie and A. L. Melander. Jan., 1909.
14. The planting of the apple orchard. By W. S. Thornber. Mar., 1909.
15. Methods of tillage for dry farming. By George Severance. Mar., 1909.
16. The sulphur-lime wash. By A. L. Melander and R. K. Beattie. Mar., 1909. See 28.
17. The single spray for the codling moth. By A. L. Melander. Apr., 1909.
18. Growing raspberries and blackberries in Washington. By W. S. Thornber. Apr., 1909.
19. The use of fertilizer lime. By R. W. Thatcher. May, 1909.
20. Summary of experiment station work, reprinted from the seventeenth annual report [for 1906-07]. By E. A. Bryan. July, 1909.
21. Experiment station's hybrid wheats. By R. W. Thatcher. Oct., 1909.
22. Tillage in its relation to soil moisture. By C. C. Thom. Oct. 20, 1909.
23. Trees in Washington. By W. S. Thornber. Nov. 1, 1909.
24. The pruning of apple trees. By W. S. Thornber. Dec. 1, 1909.
25. Gooseberries for the home garden or commercial orchard. By W. S. Thornber. Dec. 10, 1909.
26. Currants for the home garden or commercial plantation. By W. S. Thornber. Dec. 15, 1909.
27. Spraying calendar for 1910. By R. K. Beattie and A. L. Melander. [Jan., 1910.]
28. The sulphur-lime wash. By A. L. Melander and R. K. Beattie. Mar., 1910. A new edition of 2 and 16.
29. The milling quality of Washington wheats, II. By R. W. Thatcher. Apr., 1910.
30. Spraying for the codling moth. By A. L. Melander. May, 1910.
31. Clover in the Palouse country. By George Severance. Sept., 1910.
32. The manurial value of different legumes. By R. W. Thatcher. Nov. 1, 1910.
33. Spraying calendar for 1911. By R. K. Beattie and A. L. Melander. Jan. 1, 1911.
34. The soils of Washington. By R. W. Thatcher. Feb. 15, 1911.
35. Killing ground squirrels. By W. D. Foster. Feb. 15, 1911.
36. Field peas on a Palouse wheat farm. By George Severance. Mar. 15, 1911.
37. Commercial fertilizers. By Elton Fulmer. Apr. 10, 1911.
38. Corn growing in Washington. By George Severance. Apr. 20, 1911. See 60.
39. The milling quality of Washington wheats, III. By R. W. Thatcher. July 25, 1911.
40. The char-pit method of destroying stumps. By H. W. Sparks. Aug. 1, 1911.
41. Butter making on the farm. By A. B. Nystrom. Dec. 15, 1911.
42. Alfalfa seed production. By R. W. Thatcher. Dec. 30, 1911.
43. Spraying calendar for 1912. By R. K. Beattie and A. L. Melander. Jan. 1, 1912.
44. Some problems in soil fertility. By George Severance. Apr. 1, 1912.
45. The control of the codling moth. By A. L. Melander. Apr. 1, 1912.
46. Silos and silage. By R. C. Ashby. June 1, 1912.
47. How to make bread from soft wheat flour. By G. A. Olson. June 10, 1912.
48. The preventing of the stinking smut of wheat. By H. B. Humphrey. Oct. 10, 1912.
49. Experiments in fertilizing alfalfa. By R. W. Thatcher and G. A. Olson. Nov. 10, 1912.
50. Experiments with field peas and soy beans. By P. J. White. Jan. 30, 1913.
51. Commercial arsenates of lead and lime-sulphur. By R. W. Thatcher. Feb. 20, 1913.
52. Spraying calendar for 1913: Pests and diseases of the apple, pear, peach, plum, cherry, etc. By A. L. Melander and H. B. Humphrey. [Feb., 1913.]
53. Cause of variation in per cent of fat of market cream from farm separators. By V. R. Jones. May 19, 1913.
54. Preserving eggs. By G. A. Olson. Aug. 12, 1913. Superseded by 114.
55. Cleanliness and cold as applied to the dairy. By A. B. Nystrom. Aug. 24, 1913.
56. "Fire blight" of pear and apple. By J. G. Hall. Sept. 11, 1913.
57. Prune growing in southwestern Washington. By O. M. Morris. Feb., 1914.
58. Sheep for Washington farms. By R. C. Ashby. Sept. 13, 1913.
59. Spraying calendar for 1914: Pests and diseases of the apple, pear, peach, plum, cherry, etc. By J. G. Hall and M. A. Yothers. [Jan., 1914.]
60. Corn growing in Washington. By George Severance. Feb. 4, 1914.
61. The peach twig borer: An important enemy of stone fruits. By M. A. Yothers. Feb. 10, 1914.
62. Potato growing in Washington. By O. M. Morris, J. G. Hall, and M. A. Yothers. Feb. 15, 1914.
63. Swine husbandry in Washington. By R. C. Ashby and C. F. Monroe. July 20, 1914.
64. Winter sprays: Sulphur-lime wash and crude oil emulsions. By A. L. Melander. Feb., 1914. See 107.
65. "Fire blight." By J. G. Hall. Feb., 1914. A post card.
66. Onion culture. By O. M. Morris. March 10, 1914.
67. Top grafting of fruit trees. By O. M. Morris and C. B. Sprague. Mar. 11, 1914.
68. Report on chemical composition of wheat. By G. A. Olson. Mar., 1914.
69. Dry farming in Washington. By C. C. Thom and H. F. Holtz. Apr. 1, 1914.
70. The alfalfa weevil (*Phytomyza posticus* Cyll.). By W. O. Ellis. June 10, 1914.
71. Preparation of fruit exhibits. By R. J. Barnett. June 21, 1914.
72. Handling apples for storage. By W. J. Young. Aug., 1914.
73. Stinking smut in wheat. By H. M. Woolman. Sept. 10, 1914.
74. Lice and mites. By Helen D. Whitaker. Oct., 1914.
75. The Babcock test and its application. By R. E. Hundertmark. June, 1915.
76. Winter egg production. By Helen D. Whitaker. Dec., 1914.
77. Spraying calendar for 1915: Pests and diseases of the apple, pear, peach, plum, cherry, etc. By A. L. Melander and D. C. George. Jan., 1915.
78. The San José scale insect (*Aspidiotus perniciosus*). By A. L. Melander. Jan., 1915.
79. Pruning. By O. M. Morris. Feb., 1915.
80. Fire blight. By I. D. Cardiff. Feb., 1915.
81. An efficient alfalfa ditcher. By L. M. Lampson and Byron Hunter. Feb., 1915.
82. The yellow blight of the tomato. By D. C. George. Mar., 1915.

83. Hints on goose culture. By Helen D. Whitaker. Mar., 1915.
84. Care of brood sow. By William Hislop. Mar., 1915.
85. A movable hog house. By William Hislop. Mar., 1915.
86. Turkeys. By Helen D. Whitaker. Mar., 1915.
87. Profitable hog feeding. By William Hislop. Apr., 1915.
88. Wheat silage. By J. R. Shinn. Apr., 1915.
89. Control of tumbling mustard. By R. G. Adams and Bryon Hunter. Apr., 1915.
90. Farm manure: Methods of preservation and application. By G. A. Olson. May, 1915.
91. Essentials for growth of chicks. By Helen D. Whitaker. June, 1915.
92. Feeding dairy cows in Washington. By A. B. Nystrom. July, 1915.
93. Rural sanitation. By C. A. Magoon. Nov., 1915.
94. Contagious abortion in cows. By J. W. Kalkus. July, 1915.
95. The dairy barn and milk house, how to construct them. By R. E. Hundertmark and A. B. Nystrom. Sept. 1, 1915.
96. Butter-making on the farm. By A. B. Nystrom and R. E. Hundertmark. Oct., 1915.
97. Dairy herd records, their value, and how to keep them. By A. B. Nystrom and R. E. Hundertmark. Oct., 1915.
98. Hotbed construction. By C. B. Sprague. Jan., 1916.
99. Ground squirrel control. By W. T. Shaw. Feb., 1916.
100. The control of fruit pests and diseases. By A. L. Melander and F. D. Heald. Feb., 1916.
101. Controlling the coulee cricket. By A. L. Melander. Mar., 1916.
102. Some possibilities for the utilization of low grade and surplus fruit. By J. S. Caldwell. May, 1916.
103. Canning without sugar. By J. S. Caldwell. July, 1916.
104. Cost of pumping for irrigation. By O. L. Waller. Aug., 1916.
105. The possibilities of sugar beet culture in Washington. By I. D. Cardiff. Aug., 1916.
106. Potato growing in Washington: Potato growing. By O. M. Morris.—Potato diseases. F. D. Heald.—Potato insects. By M. A. Yothers. Feb., 1917.
107. Winter sprays: Lime-sulphur sprays and crude-oil emulsions. By A. L. Melander. Feb., 1917.
108. Tree planting in eastern Washington. By O. M. Morris. Mar. 10, 1917.
109. Celery culture. By F. W. Allen. Mar. 13, 1917.
110. Cabbage and cauliflower culture. By C. B. Sprague. Mar. 14, 1917.
111. Bean culture. By A. L. Strausz. Mar. 18, 1917.
112. Home preparation of breakfast foods and flour from whole grain. By G. A. Olson. Nov., 1917.
113. Potatoes, increase the yield by (1) better cultural methods, (2) the control of diseases, (3) the control of insect pests. By R. J. Barnett, F. D. Heald, and A. L. Melander. Apr., 1918.
114. Two methods of preserving eggs. By G. A. Olson. May, 1918.
115. The stinking smut of wheat. By F. D. Heald. Aug., 1918.
116. Two important varieties of winter wheat: A comparison of Red Russian and Hybrid 128. By E. F. Gaines. Jan., 1919.
117. The prevention of goitre (big neck) and hairlessness of new-born domestic animals. By J. W. Kalkus. Oct. 14, 1919.
118. The cost of a squirrel and squirrel control. By W. T. Shaw. Jan., 1920.
119. Head smut of corn and sorghum. By B. F. Dana and G. L. Zundel. Feb., 1919.
120. Prune growing in western Washington. By O. M. Morris. June, 1920.

## BULLETINS, SPECIAL SERIES.

1. An experiment in clearing logged-off land by the aid of a donkey engine in 1908. By W. H. Lawrence. 1909.
2. Forage plants for western Washington. By W. H. Lawrence and H. L. Blanchard. 1910.
3. Root diseases caused by *Armillaria mellea* in the Puget Sound country. By W. H. Lawrence. 1910.
4. Practical poultry buildings. By H. L. Blanchard. 1910. Revised edition 1911.
5. Club root of cabbage and allied plants. By W. H. Lawrence. 1910.
6. Thousand-headed kale and marrow cabbage. By L. J. Chapin. Feb., 1912.
7. A report covering the work of the western Washington experiment station from November 1, 1907 to April 1, 1911. By W. H. Lawrence. 1912.
8. The cost and methods of clearing land in western Washington. By Harry Thompson. 1912.
9. Potato growing. By O. M. Morris. Mar., 1912.

## GENERAL INDEXES.

Index to Popular Bulletins 1 to 100. By H. B. Clees. Aug., 1916.

## WEST VIRGINIA.

West Virginia Agricultural Experiment Station, Morgantown.

## BULLETINS.

1. Organization and work of station. By J. A. Myers. July, 1888.
2. The history, properties, source of the ingredients, mode of application, and uses of commercial fertilizers. By A. R. Whitehill. Oct., 1888.
3. Birds of West Virginia. By W. D. Doan. Dec., 1888.
4. The creamery industry: Its adaptability to West Virginia. By A. C. Magruder. Mar., 1889.
5. The selection of milch cows. By A. C. Magruder. June, 1889.
6. Six months' experience in running a creamery; improved process of handling cream and churning. By J. A. Myers. 1889.
7. Experiments upon wheat; experiments upon fruit trees; experiments upon garden seeds, etc.; experiments upon grasses and forage crops; experiments upon miscellaneous subjects. By J. A. Myers. 1890.
8. Summary of meteorological observations and reports of correspondents on condition of agriculture. By J. A. Myers [and others]. June, 1890.
9. Additional reports upon wheat distributed in 1889; meteorological report for July; reports of correspondents upon meteorology and crops for July. By J. A. Myers [and others]. July, 1890.
10. Meteorological report for August; reports of correspondents upon meteorology and crops for August. By J. A. Myers [and others]. Aug., 1890.
11. Meteorological report for September; reports of correspondents upon meteorology and crops for September. By J. A. Myers [and others]. Sept., 1890.
12. The Canada thistle (*Cnicus arvensis* (L.) Hoffm.). By C. F. Millspaugh. Dec., 1890. [Imprint] 1891.
13. The creamery industry. By J. A. Myers. Jan., 1891.

14. Farm and garden insects and experiments with remedies; notes of the season. By A. D. Hopkins. Feb., 1891.
15. Raspberry gouty-gall beetle or red-necked agrilus (*Agrilus ruficollis* Fabri.). By A. D. Hopkins. Mar., 1891.
16. Preliminary investigations of insect ravages: Yellow locust. (Forest and shade tree insects, I.) By A. D. Hopkins. Apr., 1891.
17. Preliminary report: Black spruce. (Forest and shade tree insects, II.) By A. D. Hopkins. May, 1891.
18. Law and regulations concerning the sale of commercial fertilizers in the State of West Virginia; analyses. By J. A. Myers. Sept., 1891.
19. Your weeds and your neighbor's: Weeds as fertilizers. By C. F. Millsbaugh. Nov., 1891.
20. Potato culture and fertilization and tests of some varieties of tomatoes. By D. D. Johnson. Jan., 1892.
21. Injurious insects and plant diseases. By A. D. Hopkins and C. F. Millsbaugh. Apr., 1892.
22. Your weeds and your neighbor's: Distribution of our weeds; bad points of weeds; weeds as fodder for stock; chemical weed exterminators. By C. F. Millsbaugh. Feb., 1892.
23. Your weeds and your neighbor's: Illustrated descriptive list of weeds. By C. F. Millsbaugh. May, 1892.
24. Flora of West Virginia. By C. F. Millsbaugh. June, 1892.
25. Plat experiments with commercial fertilizers on wheat. By D. D. Johnson. Aug., 1892.
26. Law and regulations concerning sale of commercial fertilizers in the State of West Virginia; analyses. [By J. A. Myers and R. J. J. De Roode.] Sept., 1892.
27. Notes on pruning. By F. W. Rane. Nov., 1892.
28. Plat experiments with commercial fertilizers on corn. By D. D. Johnson. Dec., 1892.
29. Experiments on potatoes at the station; experiments on corn at the outstations. By D. D. Johnson. Jan., 1893.
30. Address and notes on sheep. By A. D. Hopkins. 1893.
31. Catalogue of West Virginia Scolytidae and their enemies. By A. D. Hopkins. Apr., 1893.
32. Catalogue of West Virginia forest and shade tree insects. By A. D. Hopkins. May, 1893.
33. Subirrigation in the greenhouse. By F. W. Rane. Sept., 1893.
34. Fertilizer analyses for the year ending December 31, 1893. By J. A. Myers and R. J. J. De Roode. Dec., 1893.
35. Defects in wood caused by insects. By A. D. Hopkins. Jan., 1894.
36. Black holes in wood. By A. D. Hopkins. Feb., 1894.
37. Electro-horticulture with the incandescent lamps. By F. W. Rane. July, 1894.
38. Potatoes: potato blight; potato scab. By F. W. Rane. Nov., 1894.
39. Vegetables. By F. W. Rane. Jan., 1895.
40. Commercial fertilizers. By B. H. Hite. Dec., 1895.
41. Potatoes. By L. C. Corbett. Jan., 1896.
42. Vegetables. By L. C. Corbett. Feb., 1896.
43. Why, when, what, and how to spray. By L. C. Corbett. Mar., 1896.
44. Practical entomology: Insects injurious to farm and garden crops, the character of the injury, the insect causing it, the remedy, briefly and plainly stated. By A. D. Hopkins and W. E. Rumsey. Apr., 1896.
45. Chickens. By J. A. Myers. Dec., 1896.
46. Fertilizer analyses. By B. H. Hite. Dec., 1896.
47. Apples. By L. C. Corbett. Dec., 1896.
48. Raspberries. By L. C. Corbett. Dec., 1896.
49. Vegetables. By L. C. Corbett. Mar., 1897.
50. The periodical cicada in West Virginia. By A. D. Hopkins. Jan., 1898. See 68.
51. Commercial fertilizers. By B. H. Hite. Jan., 1898.
52. Strawberries. By L. C. Corbett. Mar., 1898.
53. Commercial fertilizers. By J. H. Stewart and B. H. Hite. Dec., 1898.
54. Nursery hints. By L. C. Corbett. Jan., 1899.
55. Sugar beet investigations in 1898. By J. H. Stewart and B. H. Hite. Mar., 1899.
56. Report on investigations to determine the cause of unhealthy conditions of the spruce and pine from 1880-1893. By A. D. Hopkins. Apr., 1899.
57. Commercial fertilizers. By B. H. Hite and T. F. Watson. May, 1899.
58. The effect of pressure in the preservation of milk, a preliminary report. By B. H. Hite. June, 1899.
59. Whole corn compared with corn meal for fattening hogs. By J. H. Stewart and Horace Atwood. June, 1899.
60. Poultry experiments. By J. H. Stewart and Horace Atwood. June, 1899.
61. Sheep feeding experiments. By J. H. Stewart and Horace Atwood. Sept., 1899.
62. A study of the effect of incandescent gas light on plant growth. By L. C. Corbett. Oct., 1899.
63. Commercial fertilizers, 1899. By J. H. Stewart and B. H. Hite. Jan., 1900.
64. Sugar beet investigation in 1899. By J. H. Stewart and B. H. Hite. Jan., 1900.
65. Commercial fertilizers [Jan.-Mar., 1900]. By J. H. Stewart and B. H. Hite. Apr., 1900.
66. Fruit diseases and how to treat them. By L. C. Corbett. Feb., 1900.
67. The Hessian fly in West Virginia and how to prevent losses from its ravages. By A. D. Hopkins. Aug., 1900. See 69.
68. The periodical cicada or seventeen-year locust in West Virginia. By A. D. Hopkins. Sept., 1900. A revision of 50.
69. Report on examination of wheat stubble from different sections of the State; the joint worm in wheat. By A. D. Hopkins. Oct., 1900. Supplements 67.
70. Spraying: Results of the season, 1900. By L. C. Corbett. Nov., 1900.
71. Poultry experiments. By J. H. Stewart and Horace Atwood. Dec., 1900.
72. Commercial fertilizers [1900]. By J. H. Stewart and B. H. Hite. Jan., 1901.
73. Poultry experiments: Loss of weight in eggs during incubation. By J. H. Stewart and Horace Atwood. Feb., 1901.
74. Cold storage. By L. C. Corbett. Mar., 1901.
75. Apple districts of West Virginia. By L. C. Corbett. Apr., 1901.
76. Commercial fertilizers [Jan. 1-May 2, 1901]. By J. H. Stewart and B. H. Hite. May 2, 1901.
77. The new fertilizer law. By J. H. Stewart. Sept., 1901.
78. Treatment for San José scale. By J. H. Stewart. Jan., 1902.
79. Commercial fertilizers, 1901. By J. H. Stewart and B. H. Hite. Jan., 1902.
80. Fertilizers: Sources and composition. By B. H. Hite. Apr., 1902.
81. Vegetable gardening in the mountain glades. By L. C. Corbett and K. C. Davis. Apr., 1902.
82. Peach growing in West Virginia. By K. C. Davis. Apr., 1902.

83. Poultry experiments. By J. H. Stewart and Horace Atwood. Sept., 1902.
84. Experiments with buckwheat and oats. By J. H. Stewart and Horace Atwood. Jan., 1903.
85. Commercial fertilizers: Complete report for 1902. By J. H. Stewart and B. H. Hite. Dec., 1902.
86. Cranberries in West Virginia. By L. C. Corbett. Apr., 1903.
88. [i. e. 87]. Greenhouses. By L. C. Corbett. May, 1903.
88. Poultry experiments. By J. H. Stewart and Horace Atwood. Aug., 1903.
89. Rural water supply with a study of the Monongahela River supply at Morgantown. By C. D. Howard. Sept., 1903.
90. Sheep feeding experiments; notes on parasites. By J. H. Stewart and Horace Atwood. Oct., 1903.
91. Commercial fertilizers: Report for 1903. By J. H. Stewart and B. H. Hite. Nov., 1903.
92. Commercial fertilizers: Report for 1903. By J. H. Stewart and B. H. Hite. Dec., 1903.
93. Mixtures and appliances for spraying. By T. C. Johnson. Nov., 1904.
94. Diseases of melons and cucumbers during 1903 and 1904. By J. L. Sheldon. Dec., 1904.
95. Commercial fertilizers: Complete report for 1904. By J. H. Stewart and B. H. Hite. Dec., 1904.
96. A report on plant diseases of the state. By J. L. Sheldon. June 30, 1905.
97. Commercial fertilizers: Complete report for 1905. By J. H. Stewart and B. H. Hite. Dec., 1905.
98. Raising chicks artificially. By J. H. Stewart and Horace Atwood. Jan., 1906.
99. Experiments with fertilizers. By J. H. Stewart and Horace Atwood. Feb., 1906. See also 155.
100. The grape curculio. By F. E. Brooks. Mar., 1906.
101. Experiments in the manuring of a meadow. By J. H. Stewart and Horace Atwood. Mar., 1906.
102. Poultry experiments: The value of skim milk for egg production. White Leghorns versus mongrels. By J. H. Stewart and Horace Atwood. May, 1906.
103. Occurrence of barium in the Ohio valley brines and its relation to stock poisoning. By C. D. Howard. June, 1906.
104. The ripe rot or mummy disease of guavas. By J. L. Sheldon. Apr. 1, 1906.
105. Tubercles on legumes with and without cultures. By J. L. Sheldon. June 1, 1906.
106. Feeding experiments with milch cows. By J. H. Stewart and Horace Atwood. June 1, 1906.
107. A test of different sprays for the San José scale. By W. E. Rumsey and F. E. Brooks. June, 1907.
108. Commercial fertilizers: Complete report for 1906. By J. H. Stewart and B. H. Hite. Dec., 1906.
109. Feeding grain to milch cows at pasture. By J. H. Stewart and Horace Atwood. Aug., 1907.
110. The grapevine root borer. By F. E. Brooks. Nov., 1907.
111. Bacteria in milk and artificial refrigeration for dairymen. By J. H. Stewart and Horace Atwood. Jan. 1, 1908.
112. Experiment with fertilizers. By J. H. Stewart and Horace Atwood. Feb. 1, 1908. See also 155.
113. Notes on the habits of mice, moles, and shrews; a preliminary report. By F. E. Brooks. Jan., 1908.
114. Commercial fertilizers: Complete report for 1907. By J. H. Stewart and B. H. Hite. Dec. 31, 1907.
115. Poultry experiments: A record of six hundred hens. By J. H. Stewart and Horace Atwood. Apr., 1908.
116. Starting young orchards: Orchard notes. By W. M. Munson.—Enemies of young fruit trees. By W. E. Rumsey and F. E. Brooks.—Poultry in the orchard. By Horace Atwood. Apr. 1, 1908.
117. Tomato notes. By W. M. Munson. June, 1908.
118. Commercial fertilizers: Complete report for 1908. By J. H. Stewart and B. H. Hite. Dec., 1908.
119. The grapevine gall maker and the grapevine girdler. By F. E. Brooks. Jan., 1909.
120. Cabbage worms and suggestions for destroying them. By W. E. Rumsey and F. E. Brooks. Apr., 1909.
121. Apple enemies and how to fight them. By W. M. Munson. Apr., 1909.
122. The farmer's home garden. By A. L. Dacy. May, 1909.
123. Diseases of garden crops and their control. By N. J. Giddings. May 18, 1909.
124. Some factors influencing the vigor of incubator chickens. By J. H. Stewart and Horace Atwood. Aug., 1909.
125. Commercial fertilizers: Complete report for 1909. By B. H. Hite and F. B. Kunst. Jan., 1910.
126. Three snout beetles that attack apples: Plum curculio, apple curculio, apple weevil. By F. E. Brooks. Jan., 1910.
127. Spraying for the codling moth: Eastern and western methods compared. (A preliminary report.) By W. E. Rumsey. Mar., 1910.
128. Snout beetles that injure nuts. By F. E. Brooks. Mar., 1910.
129. Construction of silo. By Horace Atwood. July, 1910.
130. Construction of a modern poultry house and report of experiments in hopper feeding laying hens. By Horace Atwood. Sept., 1910.
131. Plat experiments with fertilizers. By J. H. Stewart and Horace Atwood. Nov., 1910. See also 155.
132. Commercial fertilizers: A complete report for 1910. By B. H. Hite and F. B. Kunst. Dec., 1910.
133. Suggestions for spraying. By W. E. Rumsey, N. J. Giddings and A. L. Dacy. Apr., 1911.
134. Experiments in the production of sanitary milk. By Horace Atwood and N. J. Giddings. June, 1911.
135. West Virginia as a poultry State. By Horace Atwood. Sept., 1911.
136. The apple orchard from planting to bearing age. By A. L. Dacy. Feb., 1912.
137. The chestnut bark disease. By N. J. Giddings. Mar., 1912.
138. Commercial fertilizers inspection 1911. By B. H. Hite and F. B. Kunst. Apr., 1912.
139. Packing apples and peaches. By W. H. Alderman. Sept., 1912.
140. Potato culture in West Virginia: Possibilities as a truck crop; essentials of culture. By A. L. Dacy. Apr., 1913.
141. The rejuvenation of old orchards. By W. H. Alderman. Apr., 1913.
142. Fertilizer experiments with tomatoes. By A. L. Dacy. Nov., 1913.
143. A market garden and truck survey of the Ohio and Kanawha River Valleys. By A. L. Dacy. Apr., 1914.
144. Agricultural production in West Virginia. By O. M. Johnson. Mar., 1914.
145. Some factors affecting the weight, composition, and hatchability of hen eggs. By Horace Atwood. May, 1914.
146. The effect of pressure on certain microorganisms encountered in the preservation of fruits and vegetables. By B. H. Hite, N. J. Giddings, and C. E. Weakley, Jr. Oct., 1914.
147. An orchard survey of Jefferson County. By R. R. Jeffries. Nov., 1914.
148. A poultry survey of Jackson County. By F. S. Jacoby. Dec., 1914.
149. Small fruits for home and commercial planting. By L. F. Sutton. Apr., 1915.
150. The fertilization of peach orchards. By W. H. Alderman. May, 1915.
151. An apple orchard survey of Berkeley County. By E. C. Auchter. June, 1915.
152. White burley tobacco: Experiments and cultural directions. By I. S. Cook and C. H. Scherffius. June, 1916.
153. An agricultural survey of Brooke County. By O. M. Johnson and A. J. Dadisman. Aug., 1915.
154. Apple rust. By N. J. Giddings and Anthony Berg. Aug., 1915.

155. Experiments with fertilizers. By F. E. Bear. Oct., 1915. A summary of work reported in 99, 112, 131, with subsequent data.
156. A second report on the university farm garden. By A. L. Dacy. Apr., 1916.
157. Silos and silage. By E. W. Sheets.—Building instructions for home-made silos. By G. L. Oliver. July, 1916.
158. The apple as affected by varying degrees of dormant and seasonal pruning. By W. H. Alderman and E. C. Auchter. July, 1916.
159. Methods in soil analysis. By F. E. Bear and R. M. Salter. Aug., 1916.
160. The residual effects of fertilizers. By F. E. Bear and R. M. Salter. Aug., 1916.
161. Analyses of one hundred West Virginia soils. By F. E. Bear and R. M. Salter. Aug., 1916.
162. Five years' investigations in apple thinning. By E. C. Auchter. Jan., 1917.
163. Amount and cost of labor required for growing crops in West Virginia. By O. M. Johnson and A. J. Dadisman. Nov., 1916.
164. Pruning fruit trees. By W. H. Alderman and E. C. Auchter. Mar., 1917.
165. Potato and tomato diseases. By N. J. Giddings. Sept., 1917.
166. Certain characteristics of hen eggs. By Horace Atwood and C. E. Weakley, jr. Sept., 1917.
167. Orchard spraying versus dusting. By N. J. Giddings. Nov., 1918.
168. Analyses of West Virginia soils. (Second report.) By R. M. Salter and C. F. Wells. Dec., 1918.
169. A study of the factors governing the efficiency of distribution and rate of discharge of spray nozzles. By H. L. Crane. Jan., 1919.
170. Infection and immunity in apple rust. By N. J. Giddings. Dec., 1918.
171. Experiments with buckwheat. By F. W. Stemple. Aug., 1919.
172. Soybean experiments. By F. W. Stemple. Aug., 1919.
173. A two-year farm management survey of Greenbrier and Monroe Counties. By A. J. Dadisman and C. F. Sarle. Feb., 1920.
174. The fertilization of apple orchards. By W. H. Alderman and H. L. Crane. Apr., 1920.
175. West Virginia trees. By A. B. Brooks. Sept., 1920.

## SPECIAL BULLETINS.

- [1.] Potash and paying crops [compiled by A. de Ghequier. 1890. Identical with Georgia Sta. Bul. 9; Maryland Sta. Special Bul. [B]; Tennessee Sta. Special Bul. D
2. Proceedings connected with the celebration upon the completion of the station building and the organization of the Sheep Breeders and Wool Growers Association, the State Horticultural Society, and the State Dairy Association, Apr. 5, 1894, 1895.
3. San José scale in West Virginia. By T. E. Brooks and A. E. Rumsey. Mar., 1905.
4. Spraying for San José scale. By W. E. Rumsey and Fred Brooks. Nov., 1907.

## WISCONSIN.

## Agricultural Experiment Station of the University of Wisconsin, Madison

## BULLETINS.

1. Sweet skim milk: Its value as a food for pigs and calves. Aug., 1883.
2. Amount and condition of seed corn in Wisconsin. Apr., 1884.
3. Composition and digestibility of fodders. June, 1884.
4. Experiments on milk production. Sept., 1884.
5. Analyses of feeding stuffs. Apr., 1885.
6. Experiments on calf feeding. By W. A. Henry.—Analyses of fertilizers. By H. P. Armsby. July, 1885.
7. Experiments on calf feeding. By W. A. Henry.—The Cooley system of creaming milk. By H. P. Armsby. Oct., 1885.
8. Oil meal vs. corn meal for milk. By H. P. Armsby. Dec., 1885.
9. Report on oats, potatoes, and corn for 1885. By W. A. Henry. Mar., 1886.
10. Tests of dairy cows. By H. P. Armsby. Oct., 1886.
11. Report on wheat, oats, barley, potatoes, and corn for 1886. Apr., 1887.
12. The oil test for cream. By H. P. Armsby and F. G. Short. Oct., 1887.
13. Report on wheat, oats, barley, corn, and potatoes for 1887. By L. H. Adams.—The station vineyard. By W. A. Henry. Feb., 1888.
14. Artificial fertilizers and land plaster. By A. M. Babcock. Apr., 1888.
15. Ensilage vs. corn fodder for milk production. By F. W. Woll. May, 1888.
16. A new method for determining fat in milk. By F. G. Short. July, 1888. See 36.
17. Report on corn, oats, barley, and potatoes. By L. H. Adams.—Grape growing. By W. A. Henry. Nov., 1888.
18. The constitution of milk and some of the conditions which affect the separation of cream. By S. M. Babcock. Jan., 1889.
19. Notes on ensilage. By W. A. Henry, L. H. Adams, and F. G. Short. Apr., 1889.
20. Noxious weeds of Wisconsin. By E. S. Goff. July, 1889. See 76.
21. Comparative value of warm and cold water for milch cows in winter. By F. H. King. Oct., 1889.
22. Report on oats and barley for 1889. By L. H. Adams.—Report on potatoes for 1889. By E. S. Goff. Jan., 1890.
23. Prevention of apple scab. By E. S. Goff. Apr., 1890.
24. A new method for the estimation of fat in milk, especially adapted to creameries and cheese factories. By S. M. Babcock. July, 1890.
25. Feeding bone meal and hard wood ashes to hogs living on corn. By W. A. Henry. Oct., 1890.
26. Sugar-beet culture in Wisconsin. By W. A. Henry and F. W. Woll. Jan., 1891.
27. The feeding value of whey. By W. A. Henry. Apr., 1891.
28. The construction of silos. By F. H. King. July, 1891.
29. Creaming experiments. By S. M. Babcock. Oct., 1891.
30. Sugar-beet experiments in Wisconsin for 1891. By F. W. Woll. Jan., 1892.
31. Notes on the use of the Babcock test and the lactometer. By S. M. Babcock. Apr., 1892. See 36.
32. Feeding grain to lambs; cottonseed meal compared with oil meal for feeding lambs. By J. A. Craig. July, 1892.
33. Rations for dairy cows. By F. W. Woll. Oct., 1892. See also 38.
34. Preventive treatment for apple scab, downy mildew, and brown rot of grape, potato blight and smut of wheat and oats. By E. S. Goff. Jan., 1893.
35. Insects and diseases injurious to cranberries. By E. S. Goff. Apr., 1893.
36. Directions for using the Babcock milk test and the lactometer. By S. M. Babcock. July, 1893. Supersedes 16, 31.

37. The Russian thistle. By E. S. Goff. Oct., 1893.
38. One hundred American rations for dairy cows. By F. W. Woll. Jan., 1894. A continuation of 33.
39. Noxious weeds. By E. S. Goff. Apr., 1894. See 76.
40. Tuberculosis and the tuberculin test. By H. L. Russell. July, 1894.
41. Grain feeding lambs for market. By J. A. Craig. Aug., 1894.
42. Destructive effects of winds on sandy soils and light sandy loams, with methods for protection. By F. H. King. Oct., 1894.
43. The agricultural, horticultural, and livestock features of a portion of Wisconsin tributary to Superior: The agricultural possibilities of Douglas County and northwest Wisconsin. By F. H. King.—Horticultural possibilities of northwest Wisconsin. By E. S. Goff.—Dairy and sheep farming at Superior. By J. A. Craig. Jan., 1895.
44. Pasteurization of milk and cream for direct consumption. By H. L. Russell. Apr., 1895.
45. Apple culture: Notes and data from 172 orchards. By E. S. Goff. July, 1895.
46. Power tests of centrifugal cream separators. By A. W. Richter. Oct., 1895.
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316. Farm labor in Wisconsin. By H. C. Taylor and J. D. Black. June, 1920.
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318. Credit needs of settlers in upper Wisconsin. By R. T. Ely, B. H. Hibbard, and A. B. Cox. Oct., 1920.
319. Experiments in farming: Annual report of the director of the experiment station, 1918-19. By H. L. Russell and F. B. Morrison. Sept., 1920.
320. Clear more land. By John Swenehart. Dec., 1920.
321. Cheesemakers save by figuring costs. By J. L. Sammis and O. A. Juve. Nov., 1920.
322. Marketing by federations. By Theodore Macklin. Dec., 1920.
323. New farm facts: Annual report of the director, 1919-20. By H. L. Russell and F. B. Morrison. Dec., 1920.

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1. The rôle of inorganic phosphorus in the nutrition of animals. By E. B. Hart, E. V. McCollum, and J. G. Fuller. June, 1909.
2. Factors influencing the phosphate content of soils: Phosphate content of soils as affected by methods of farming. By A. R. Whitson and C. W. Stoddart.—Phosphate availability in its relation to soil acidity. By C. W. Stoddard. June, 1909.
3. The efficiency, economy and physiological effect of machine milking. By F. W. Woll and G. C. Humphrey. June, 1909.
4. Some conditions which influence the germination and fertility of pollen. By E. P. Sandsten. June, 1909.
5. The rôle of the ash constituents of wheat bran in the metabolism of herbivora. By E. B. Hart, E. V. McCollum, and G. C. Humphrey. June, 1909.
6. Studies on the bacterial and leucocyte content of milk: Bacterial content of the milk of individual animals. By E. G. Hastings and Conrad Hoffman.—The occurrence and distribution of a lactic acid organism resembling the *Bacillus bulgaricus* of yogurt. By E. G. Hastings and B. W. Hammer.—Experimental leucocytosis in the cow's udder. By Conrad Hoffman. June, 1909.
7. Factors controlling the moisture content of cheese curds. By J. L. Sammis, S. K. Suzuki and F. W. Laabs. Feb., 1910.
8. Nuclein synthesis in the animal body. By E. V. McCollum. May, 1910.
9. The nature of the acid-soluble phosphorus compounds of some important feeding materials. By E. B. Hart and W. E. Tottigham. May, 1910.
10. Some improved methods of dairy chemistry analysis: A volumetric method for the estimation of casein in cows' milk. By E. B. Hart.—The quantitative estimation of lactic acid in cheddar cheese. By S. K. Suzuki and E. B. Hart.—The relation of different acids to the precipitation of casein and the solubility of cheese curds in salt solutions. By J. L. Sammis and E. B. Hart. May, 1910.
11. The production of volatile fatty acids and esters in cheddar cheese and their relation to the development of flavor. By S. K. Suzuki, E. G. Hastings, and E. B. Hart. June, 1910.
12. Some factors concerned in the fixation of nitrogen by azotobacter. By Conrad Hoffman and B. W. Hammer. June, 1910.
13. Studies of the protein requirements of dairy cows. By F. W. Woll and G. C. Humphrey. June, 1910. See also Bul. 200.
14. Sulphur requirements of farm crops in relation to the soil and air supply. By E. B. Hart and W. H. Peterson. Apr., 1911.
15. Experiments on spore germination and infection in certain species of Oomycetes. By I. E. Melhus. June, 1911.
16. The place of economics in agricultural education and research. By H. C. Taylor. June, 1911.
17. Physiological effect on growth and reproduction of rations balanced from restricted sources. By E. B. Hart, E. V. McCollum, Harry Steenbock, and G. C. Humphrey. June, 1911.
18. A scleritium disease of blue joint and other grasses. By A. B. Stout. June, 1911.
19. Effect of heat and oxidation on the phosphorus of the soil. By P. P. Peterson. Dec., 1911.
20. Factors influencing the availability of rock phosphate. By Emil Truog. Jan., 1912.
21. Studies of the nutrition of the pig. By E. V. McCollum and Harry Steenbock. Feb., 1912.
22. Metabolic water: Its production and rôle in vital phenomena. By S. M. Babcock. Mar., 1912.
23. Relation of soil bacteria to evaporation. By Conrad Hoffmann. Apr., 1912.
24. The diagnosis of contagious abortion in cattle by means of the complement fixation test. By F. B. Hadley and B. A. Beach. June, 1912.
25. Studies on the factors concerned in the ripening of cheddar cheese. By E. G. Hastings, A. C. Evans, and E. B. Hart. July, 1912.
26. Studies in dairy production based on the records secured in the Wisconsin dairy cow competition, 1909-11. By F. W. Woll. Oct., 1912. See also Bul. 226.
27. The manufacture of cheddar cheese from pasteurized milk. By J. L. Sammis and A. T. Bruhn. Dec., 1912.
28. Avian tuberculosis. By E. G. Hastings and J. G. Halpin. Mar., 1913.
29. Nature of the changes in the solubility and availability of phosphorus in fermenting mixtures. By W. E. Tottigham and Conrad Hoffmann. May, 1913.
30. Calcium and phosphorus supply of farm feeds and their relation to the animal's requirements. By E. B. Hart, Harry Steenbock, and J. G. Fuller. Feb., 1914.
31. The control of damping-off disease in plant beds. By James Johnson. Mar., 1914.
32. Black rot, shed burn, and stem rot of tobacco. James Johnson. June, 1914.
33. Comparative efficiency for growth of the nitrogen of alfalfa hay and corn grain. By E. B. Hart, G. C. Humphrey and F. B. Morrison.—The comparative efficiency for milk-production of the nitrogen of alfalfa hay and corn grain. By E. B. Hart, G. C. Humphrey, J. J. Willaman, and A. R. Lamb. June, 1914.
34. The social anatomy of an agricultural community. By C. J. Galpin. May, 1915.
35. The comparative effect of phosphates and sulphates on soil bacteria. By E. B. Fred and E. B. Hart. June, 1915.
36. Acidosis in omnivora and herbivora and its relation to protein storage. By Harry Steenbock, V. E. Nelson, and E. B. Hart. Sept., 1915.
37. Germination and infection with the fungus of the late blight of potato (*Phytophthora infestans*). By I. E. Melhus. Aug., 1915.
38. The control of cabbage yellows through disease resistance. By L. R. Jones and J. C. Gilman. Dec., 1915.

39. The gain in nitrogen from growth of legumes on acid soils. By E. B. Fred and E. J. Graul. Oct., 1916.
40. Some economic factors which influence rural education in Wisconsin. By Eugene Merritt and K. L. Hatch. Oct., 1916.
41. The utilization of phosphates by agricultural crops, including a new theory regarding the feeding power of plants. By Emil Truog. Nov., 1916.
42. Early blight of potato tubers. By L. R. Jones, Maude Miller, and E. Bailey. Aug., 1917.
43. The milling and baking qualities of Wisconsin grown wheats. By B. D. Leith. Jan., 1919.
44. Farm tenancy: An analysis of the occupancy of 500 farms. By C. J. Galpin and Emily F. Hoag. Feb., 1919.
45. The common cabbage worm in Wisconsin (*Pontia rapae* Linn.). By H. F. Wilson, R. C. Pickett, and L. G. Gentner. Aug., 1919.
46. Frost necrosis of potato tubers. By L. R. Jones, Maude Miller, and E. Bailey. Oct., 1919.
47. Farm leasing systems in Wisconsin. By B. H. Hibbard and J. D. Black. Oct., 1920.
48. Fusarium resistant cabbage. By L. R. Jones, J. C. Walker, and W. B. Tisdale. Nov., 1920.
49. Influence of rations restricted to the oat plant on reproduction in cattle. By E. B. Hart, Harry Steenbock, and G. C. Humphrey. Nov., 1920.

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General index of agricultural publications of the University of Wisconsin issued prior to 1894. (Wisconsin Sta., Ann. Rpt. 1892-93, p. 313-335.)

## WYOMING.

## Wyoming Agricultural Experiment Station, Laramie.

## BULLETINS.

1. The organization and the proposed work of the station. [By Dice McLaren and others.] May, 1891.
2. Plant lice. By F. J. Niswander. Aug., 1891.
3. The sugar beet in Wyoming. By Dice McLaren and E. E. Slosson. Nov., 1891.
4. Meteorology for 1891. By B. C. Buffum. Dec., 1891.
5. Best varieties [of field crops] and breeds [of live stock] for Wyoming. By Dice McLaren and B. C. Buffum. Feb., 1892. Parts also issued separately.
6. Soils of the agricultural experiment farms. By J. D. Conley and E. E. Slosson. May, 1892.
7. Insecticides. By F. J. Niswander. July, 1892.
8. Irrigation and duty of water. By B. C. Buffum. Oct., 1892.
9. Sugar beets in 1892. By E. E. Slosson. Dec., 1892.
10. Meteorology for 1892. By B. C. Buffum. Dec. 31, 1892.
11. Crop report for 1892. By A. A. Johnson and F. J. Niswander. Feb., 1893.
12. Ground squirrels (gophers). By F. J. Niswander. Apr., 1893.
13. The feeding and management of cattle. By W. A. Henry. July, 1893. Reprinted from U. S. Dept. Agr., Bur. Anim. Indust., Special Report on Diseases of Cattle and on Cattle Feeding, 1892, p. 439-479.
14. Geology of Wyoming experimental farm and notes on mineral resources of the State. By W. C. Knight. Oct., 1893.
15. The winter-killing of trees and shrubs. By Aven Nelson. Dec., 1893.
16. Grasses and forage plants. By B. C. Buffum. Dec., 1893.
17. Crop report for 1893.—Cost and profit of growing wheat. By B. C. Buffum.—Sugar beets in 1893. By E. E. Slosson.—Garden vegetables and tobacco; progress report on fruits and trees; meteorology for 1893. By B. C. Buffum. Mar., 1894.
18. The reclamation of arid lands; the Harvey water motor. By A. A. Johnson. June, 1894.
19. Squirrel-tail grass (fox-tail), one of the stock pests of Wyoming. By Aven Nelson. Sept., 1894.
20. The artesian wells of southern Wyoming; their history and relation to irrigation. By J. D. Conley. Oct., 1894.
21. The grain smuts and potato scab. By Aven Nelson. Jan., 1895.
22. Onions; crop report, 1894; cost and profit of growing wheat; small fruits at Laramie. By B. C. Buffum. Apr., 1895.
23. Notes on climate. [By J. D. Conley.] May, 1895.
24. Water analyses. By E. E. Slosson. Aug., 1895.
25. Results of three years' experiments in cost and profit of growing wheat. By B. C. Buffum. Nov., 1895.
26. Garden peas. By B. C. Buffum. Dec., 1895.
27. Meteorology for 1895, and notes on climate from 1891 to 1896. By J. D. Conley. Mar., 1896.
28. First report on the flora of Wyoming. By Aven Nelson. May, 1896.
29. Alkali; some observations and experiments. By B. C. Buffum. July, 1896.
30. Stock-feeding experiments at Lander. By B. C. Buffum. Sept., 1896.
31. The worst weeds of Wyoming, and suggested weed legislation. By Aven Nelson. Dec., 1896.
32. Potatoes. By B. C. Buffum. Mar., 1897.
33. The composition of prepared cereal foods. By E. E. Slosson. June, 1897.
34. Fruit growing in Wyoming. By B. C. Buffum. Nov., 1897.
35. Mechanical analysis and water content of Wyoming soils. By C. B. Ridgaway. Dec., 1897.
36. Wyoming sugar beets. By E. E. Slosson and B. C. Buffum. Apr., 1898.
37. The stooing of grains. By B. C. Buffum. June, 1898.
38. Cultivated shade and forest trees. By B. C. Buffum. Sept., 1898.
39. Alkali studies, II. By E. E. Slosson and B. C. Buffum. Dec., 1898.
40. The trees of Wyoming and how to know them. By Aven Nelson. Jan., 1899.
41. Some experiments with subsoiling. By B. C. Buffum and W. H. Fairfield. Nov., 1899.
42. Some native forage plants for alkali soils. By Aven Nelson. Dec., 1899.
43. Alfalfa as a hay crop. By B. C. Buffum. Mar., 1900.
44. Alfalfa as a fertilizer. By B. C. Buffum. Apr., 1900.
45. A preliminary report on the artesian basins of Wyoming. By W. C. Knight. June, 1900. Accompanied by a folded map.
46. The brome-grasses of Wyoming. By Aven Nelson. Jan., 1901.
47. Lamb feeding experiment. By Luther Foster. Apr., 1901.
48. Experiments in wheat culture. By Luther Foster and W. H. Fairfield. May, 1901.
49. Alkali series: VI. Alkali lakes and deposits. By W. C. Knight and E. E. Slosson. June, 1901.
50. Native vines in Wyoming homes. By Aven Nelson. Mar., 1902.
51. Sheep feeding on the range; lamb feeding, second trial. By F. E. Emery. May, 1902.
52. Experiments in evaporation. By C. B. Ridgaway. Apr., 1902.

53. The measurement of water for irrigation. By B. P. Fleming. June, 1902.
54. The shrubs of Wyoming. By E. E. Nelson. July, 1902.
55. The birds of Wyoming. By W. C. Knight. Sept., 1902.
56. Food adulteration in Wyoming. By E. E. Slosson. Feb., 1903.
57. Shade tree suggestions. By Aven Nelson. Mar., 1903.
58. Growing and preparing agricultural products for exhibition. By B. C. Buffum and Aven Nelson. Apr., 1903.
59. The wheat grasses of Wyoming. By Aven Nelson and E. E. Nelson. Nov., 1903.
60. Wheat growing on the Laramie Plains. By B. C. Buffum. Dec., 1903.
61. Seepage investigations in the valley of the Laramie River. By B. P. Fleming. Mar., 1904.
62. Some food products and their adulteration. By H. G. Knight and R. B. Moudy. May, 1904.
63. Native and introduced saltbushes: Three seasons' trials. By E. E. Nelson. Aug., 1904.
64. Feeding experiments with lambs, 1903. By B. C. Buffum. Feb., 1905.
65. Wyoming forage plants and their chemical composition: Studies, No. 1. By H. G. Knight, F. E. Hepner, and Aven Nelson. May, 1905.
66. Irrigation investigations on the North Platte River in 1904. By B. P. Fleming. June, 1905.
67. Duty of water. By B. P. Fleming. Aug., 1905.
68. Ration experiments with lambs, 1904-5. By G. E. Morton. Oct., 1905.
69. Digestion experiments with wethers: Alfalfa and native hay. By H. G. Knight, F. E. Hepner, and G. E. Morton. Apr., 1906.
70. Wyoming forage plants and their chemical composition: Studies, No. 2. By H. G. Knight, F. E. Hepner, and G. E. Morton. May, 1906.
71. Some potato diseases: Their cause and control. [By Aven Nelson.] Jan., 1907.
72. Duty of water on field peas, 1906. By H. T. Nowell. Feb., 1907.
73. Ration experiments with lambs, 1905-6. By G. E. Morton. Apr., 1907.
74. Ration experiments with swine. By G. E. Morton. May, 1907.
75. The life and preservation of pitch pine fence posts. By B. C. Buffum. July, 1907.
76. Wyoming forage plants and their chemical composition: Studies, No. 3. By H. G. Knight, F. E. Hepner, and Aven Nelson. Mar., 1908.
77. Irrigation of barley. By H. T. Nowell. May, 1908.
78. Digestion experiments: Native hays, oat straw, pea hay, sweet clover, and alfalfa. By H. C. Knight, F. E. Hepner, and T. F. McConnell. June, 1908.
79. Ration experiments with lambs, 1906-7. By G. E. Morton. July, 1908.
80. Dry farming in Wyoming. By J. D. Towar. Mar., 1909.
81. Lamb feeding for 1908-09. By A. D. Faville. June, 1909.
82. Soil nitrogen. By H. G. Knight and F. A. Smith. June, 1909.
83. Barley. By L. B. McWethy. Feb., 1910.
84. Field peas. By L. B. McWethy. Mar., 1910.
85. Feeding experiments, 1909-10. By A. D. Faville. May, 1910.
86. Potatoes. By T. S. Parsons. Jan., 1911.
87. Wyoming forage plants and their chemical composition. By H. G. Knight, F. E. Hepner, and Aven Nelson. Feb., 1911.
88. Woody aster (*Xylorrhiza parryi* Gray). [By O. L. Prien, Aven Nelson, and L. C. Raiford.] Apr., 1911.
89. Feeding experiments, 1910-11. By A. D. Faville. June, 1911.
90. Reclamation by drainage: An example of reclamation from seepage and alkali by means of leaching and drainage. By J. C. Fitterer. Sept., 1911.
91. The relation of the sheep-tick flagellate (*Critidia melophagia*) to the sheep's blood. By L. D. Swingle. Dec., 1911.
92. The value of fiber-testing machines for measuring the strength and elasticity of wool. By J. A. Hill. Jan., 1912. A more detailed report published as a supplement to Ann. Rpt., 21 (1910-11).
93. A comparison of sheep branding paints. By C. J. Oviatt. June, 1912.
94. The chemical examination of death camas. By F. W. Heyl, S. K. Loy, H. G. Knight, and O. L. Prien. July, 1912.
95. A comparison of cotswold and southdown grade lambs; fattening rations for aged ewes. By A. D. Faville. Sept., 1912.
96. Ration experiments with swine. By A. D. Faville. Oct., 1912.
97. The identification of the woody aster. [By Aven Nelson and H. G. Knight.] Apr., 1913.
98. Alfalfa hay for horses. By A. D. Faville. Apr., 1913.
99. The life history of the sheep tick (*Melophagus ovinus*). By L. D. Swingle. July, 1913.
100. Meteorology for twenty years. By H. G. Knight and J. C. Fitterer. Sept., 1913.
101. Zygadenine: The crystallin alkaloid of *Zygadenus intermedius*. By S. K. Loy, F. W. Heyl, and F. E. Hepner. Nov., 1913.
102. The morphology of the sheep tape-worm (*Thysanosoma actinoides*). By L. D. Swingle. Jan., 1914.
103. Corn versus barley in lamb rations; methods of feeding barley to lambs. By A. D. Faville. [1913?]
104. Forage crops. By T. S. Parsons. 1914.
105. The eradication of the sheep tick. By L. D. Swingle. Jan., 1915.
106. Cottonseed cake versus cold pressed cottonseed cake for beef cows; mixed grains versus cottonseed cake for growing beef cattle. By A. D. Faville. July, 1915.
107. Swine feeding. By A. D. Faville. Sept., 1915.
108. Cattle feeding. By A. D. Faville. Oct., 1915.
109. Sheep feeding. By A. D. Faville. Nov., 1915.
110. Sweet clover. By T. S. Parsons. Sept., 1916.
111. Alfalfa in Wyoming. By T. S. Parsons. Dec., 1916.
112. The poisonous properties of the two-grooved milk vetch (*Astragalus bisulcatus*): Chemical. By O. A. Beath—Physiological. E. H. Lehnert. Jan., 1917.
113. The effect of alkali upon Portland cement. By Karl Steik. Mar., 1917. See Bul. 122.
114. Swine feeding. By A. D. Faville. July, 1917.
115. Barley in Wyoming. By T. S. Parsons. Aug., 1917.
116. Winter grains. By T. S. Parsons. Nov., 1917.
117. Cattle feeding: Oat and pea silage for beef cows; oat and pea silage for growing cattle. By A. D. Faville. Dec., 1917.
118. Oats in Wyoming. By T. S. Parsons. Dec., 1918.
119. Spring wheats in Wyoming. By T. S. Parsons. Dec., 1918.
120. The chemical examination of three species of larkspurs (*Delphinium barbeyi*, *Delphinium glaucescens*, *Delphinium geveri*). By O. A. Beath. June, 1919.
121. Swamp fever in Wyoming: Economic importance, general characteristics and control. By J. W. Scott. June, 1919.

122. The effect of alkali upon Portland cement, II. By Karl Steik. Dec., 1919. Includes much of the work reported in Bul. 113.
123. Chemical and pharmacological examination of the woody aster. By O. A. Beath. May, 1917.
124. *Sarcocystis tenella*, the muscle parasite of the sheep. By J. W. Scott and E. C. O'Roke. June, 1920.
125. The chemical examination of the silvery lupine. Preliminary report. By O. A. Beath. June, 1920.

## STATE FARMS BULLETINS.

1. Spring wheat production in eastern Wyoming. By A. L. Nelson. Dec., 1920.
2. Winter wheat production in eastern Wyoming. By A. L. Nelson. Dec., 1920.

## INDEX BULLETINS.

- A. Indexing the first twenty-six bulletins of the station. By G. R. Hebard. July, 1896.
- B. Index to Bulletins twenty-seven to thirty-seven, July, 1896-June, 1898. By G. R. Hebard. July, 1898.
- C. Indexing Bulletins thirty-eight to fifty-three, Sept., 1898-June, 1902. By G. R. Hebard. July, 1902.
- D. Indexing Bulletins fifty-four to seventy-five, July, 1902-July, 1907. By G. R. Hebard. July, 1907.
- E. Indexing Bulletins No. one [i. e. seventy-six] to ninety-eight and Reports No. one [i. e. eighteen] to twenty-three inclusive, July, 1907-July, 1914. By J. E. Anderson. Mar., 1915

**ORGANIZATION OF THE  
UNITED STATES DEPARTMENT OF AGRICULTURE.**

February 7, 1924.

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