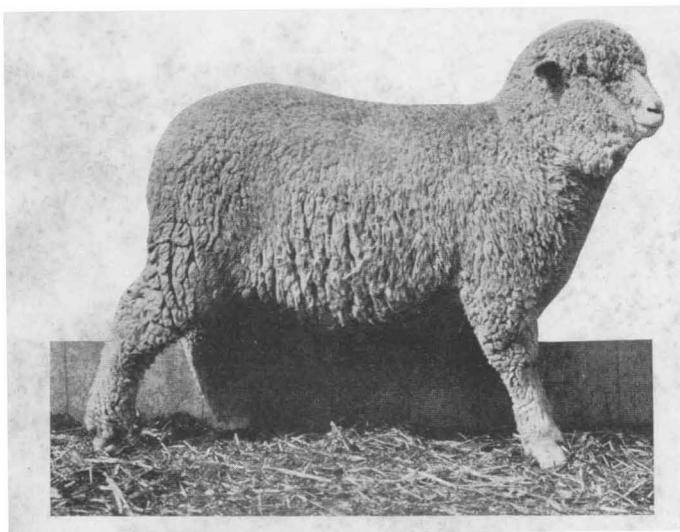


March, 1923

Bulletin No. 210

Corn Substitutes for Fattening Lambs



AGRICULTURAL EXPERIMENT STATION
IOWA STATE COLLEGE OF AGRICULTURE
AND MECHANIC ARTS

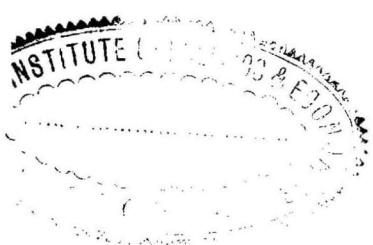
C. F. Curtiss, Director

ANIMAL HUSBANDRY SECTION

Dhananjayarao Gadgil Library



GIPE-PUNE-047394



Ames, Iowa

EXPERIMENT STATION OFFICERS AND STAFF

<p>Raymond A. Pearson, M.S.A., LL.D., President C. F. Curtiss, M.S.A., Director</p> <p>AGRICULTURAL ECONOMICS</p> <p>E. G. Nourse, A.B., Ph.D., Chief C. L. Holmes, A.B., Ph.D., Asst. Chief C. C. Taylor, B.S., Asst. C. L. Benner, A.M., Asst. John Hopkins, Jr., A.M., Asst.</p>	<p>W. H. Stevenson, A.B., B.S.A., Vice-Director</p> <p>AND FARM MANAGEMENT</p> <p>Knute Bjorka, M.S., Asst. C. W. Crickman, B.S., Asst. W. H. Youngman, B.S., Asst. E. J. Working, M.S., Asst. Frank Robotka, B.S., Asst.</p>
<p>J. B. Davidson, B.S., M.E., A.E., Chief W. A. Foster, B.S. in E., B.Arch., Asst. Chief</p>	<p>AGRICULTURAL ENGINEERING</p> <p>E. V. Collins, B.S. in A.E., B.S. in Agron., Asst. Chief Verne W. Stambaugh, B.S. in A.E., Re- search Fellow</p>
<p>W. H. Stevenson, A.B., B.S.A., H.C.D., Chief</p>	<p>AGRONOMY</p> <p>P. Paul Emerson, B.S., M.S., Ph.D., Asst. Chief in Soil Bacteriology</p>
<p>H. D. Hughes, B.S., M.S.A., Chief in Farm Crops</p>	<p>F. S. Wilkins, B.S., M.S., Asst. Chief in Farm Crops</p>
<p>P. E. Brown, B.S., A.M., Ph.D., Chief in Soil Chemistry and Bacteriology</p>	<p>T. H. Benton, B.S., M.S., Soil Surveyor</p>
<p>L. C. Burnett, B.S.A., M.S., Chief in Cereal Breeding</p>	<p>D. S. Gray, B.S., Soil Surveyor</p>
<p>L. W. Forman, B.S.A., M.S., Chief in Field Experiments</p>	<p>C. L. Orben, B.S., Soil Surveyor</p>
<p>J. L. Robinson, B.S., M.S., Superintendent of Cooperative Experiments</p>	<p>A. M. O'Neal, Jr., B.S., Soil Surveyor</p>
<p>H. W. Johnson, B.S., M.S., Ph.D., Asst. Chief in Soil Chemistry</p>	<p>J. T. Auten, B.S., Soil Analyst</p>
<p>H. H. Kildee, B.S.A., M.S., Chief</p>	<p>W. G. Baker, B.S., Field Experiments</p>
<p>J. M. Evvard, B.S.A., M.S., Chief in Swine and Beef Cattle Production</p>	<p>P. E. Nordaker, B.S., Field Experiments</p>
<p>Wray E. Hammond, B.S.A., M.S., Supt. of Experiments in Animal Husbandry</p>	<p>J. L. Boatman, B.S., Field Experiments</p>
<p>C. C. Culbertson, B.S. in A. H., Asst. Chief in Animal Husbandry</p>	
<p>Q. W. Wallace, B.S., Assistant in Ani- mal Husbandry</p>	
<p>A. R. Lamb, M.S., Chief in Nutrition</p>	
<p>A. B. Caine, M.S., Chief in Horse In- vestigations</p>	
<p>R. E. Buchanan, M.S., Ph. D., Chief, As- sociate in Dairy and Soil Bacteriology</p>	<p>ANIMAL HUSBANDRY</p> <p>P. S. Shearer, B.S., Chief in Animal Breeding</p>
<p>L. H. Pammel, B.Agr., M.S., Ph.D., Chief</p>	<p>M. D. Helser, B.S.A., M.S., Chief in Meat Investigation</p>
<p>Charlotte M. King, Asst. Chief</p>	<p>G. E. Weaver, M.S., Chief in Dairy Hus- bandry</p>
<p>I. E. Melhus, B.S., Ph.D., Chief in Plant Pathology</p>	<p>James Waddell, B.S., M.S., Asst. Chief Fordyce Ely, B.S., M.S., Asst. in Dairy Husbandry</p>
<p>L. W. Durrell, B.S., M.S., Asst. Chief in Plant Pathology</p>	<p>H. A. Bittenbender, B.S.A., Chief in Poultry Husbandry</p>
<p>W. G. Gaessler, B.S., M.S., Acting Chief</p>	<p>R. L. Cochran, B.S., Asst. Chief</p>
<p>A. R. Lamb, B.S., M.S., Asst.</p>	<p>Buford H. Butcher, B. S., Graduate Asst.</p>
<p>M. Mortenson, B.S.A., Chief</p>	<p>BACTERIOLOGY</p>
<p>B. W. Hammer, Ph.D., Chief in Dairy Bacteriology</p>	<p>J. N. Martin, B.S., Ph.D., Asst.</p>
<p>Carl J. Drake, B.Sc., B.Ped., M.A., Ph.D., Chief in Entomology</p>	<p>A. L. Bakke, B.S., M.S., Ph.D., Asst.</p>
<p>F. A. Fenton, B.A., M.S., Ph.D., Asst. Chief in Entomology</p>	<p>Ray F. Crawford, B.S., Asst.</p>
<p>T. J. Maney, B.S., Chief in Pomology</p>	<p>O. H. Elmer, B.S., Asst.</p>
<p>Harvey L. Lantz, B.S., Asst. Chief</p>	<p>Karl F. Petsch, B.S., Field Asst.</p>
<p>H. H. Plagge, B.S., Asst. in Pomology</p>	<p>F. P. Sipe, B.S., Fellow</p>
<p>A. T. Erwin, M.S., Chief in Truck Corps</p>	<p>CHEMISTRY</p>
<p>G. H. Von Tungeln, Ph.B., M.A., Chief</p>	<p>Edith Wilson, Asst.</p>
<p>H. G. Loomer, B.A., Asst.</p>	<p>J. A. Schulz, B. S., Asst.</p>
<p>DAIRYING</p>	<p>PLANT PATHOLOGY</p>
<p>F. F. Sherwood, M.S., Asst. Chief</p>	<p>J. N. Martin, B.S., Ph.D., Asst.</p>
<p>Merle P. Baker, B.S., Asst. in Dairying</p>	<p>A. L. Bakke, B.S., M.S., Ph.D., Asst.</p>
<p>ENTOMOLOGY</p>	<p>Ray F. Crawford, B.S., Asst.</p>
<p>Albert Hartzell, B.S., M.S., Asst.</p>	<p>O. H. Elmer, B.S., Asst.</p>
<p>Wallace Park, B.S., Asst. Chief in Api- culture</p>	<p>Karl F. Petsch, B.S., Field Asst.</p>
<p>Wallace Colman, A.B., M.S., Asst.</p>	<p>F. P. Sipe, B.S., Fellow</p>
<p>HORTICULTURE AND FORESTRY</p>	<p>CULTURE</p>
<p>W. C. Calvert, B.S., Asst. in Truck Crops</p>	<p>W. C. Calvert, B.S., Asst. in Truck Crops</p>
<p>E. A. Piester, B. S., Acting Chief in</p>	<p>E. A. Piester, B. S., Acting Chief in</p>
<p>Landscape Architecture</p>	<p>Landscape Architecture</p>
<p>G. B. MacDonald, B.S.F., M.F., Chief in</p>	<p>G. B. MacDonald, B.S.F., M.F., Chief in</p>
<p>Forestry</p>	<p>Forestry</p>
<p>RURAL SOCIOLOGY</p>	<p>FORESTRY</p>
<p>W. W. Weaver, B.S., Asst.</p>	<p>W. C. Calvert, B.S., Asst. in Truck Crops</p>
<p>BULLETIN SECTION</p>	<p>E. A. Piester, B. S., Acting Chief in</p>
<p>F. W. Beckman, Ph.B., Bulletin Editor</p>	<p>Landscape Architecture</p>
<p>Olive Sandford Alecox, Asst. Bulletin Editor</p>	<p>G. B. MacDonald, B.S.F., M.F., Chief in</p>
<p>PHOTOGRAPHIC SECTION</p>	<p>Forestry</p>
<p>E. H. Richardson, Photographer</p>	

417394

TABLE OF CONTENTS

PART I

Summary	206
Objects of the Experiment.....	207
Animals Used in Test.....	207
Methods of Experimentation and Care of Animals.....	207
Rations Fed	208
Feeds Described	208
Chemical Composition of Feeds.....	209
Methods of Feeding	210
Gains Made by Lambs.....	210
Average Daily Feed Eaten.....	210
Complete Figures on Results.....	211
Water Consumption of the Lambs.....	212
Feed Required for One Hundred Pounds Gain.....	212
Shrinkage and Dressing Percentage of Lambs.....	213
Packer's Comment on Carcasses.....	214

PART II

Summary	218
Animals Used in Experiment.....	219
Methods of Experimentation and Care of Animals.....	219
Rations Fed	220
Description of Feeds.....	220
Chemical Analysis of Feeds.....	221
Methods of Feeding	221
Gains Made by the Lambs.....	221
Complete Figures on Results.....	222
Water Consumption	223
Average Daily Feed Eaten.....	223
Feed Required for One Hundred Pounds Gain.....	224
Shrinkage and Dressing Percentage of Lambs.....	225
Packer's Comment on Carcasses.....	226
Renal Calculi Findings.....	229