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A REPORT OF PROGRESS

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UNIVERSITY OF WYOMING
Agricultural Experiment Station

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*In cooperation with U. S. Department of Agriculture.
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A REPORT OF PROGRESS

Almost continuously since 1891 there have been state experimental farms or substations for agricultural research in Wyoming. The earliest of these were operated largely from Federal funds and, when the Federal monies were withdrawn in accordance with the United States Department of Agriculture rulings, the State of Wyoming later established stations at several points. With the growth and development of Wyoming’s agricultural production the demand increased for the assistance which such stations provide. At one time there were as many as eleven state farms in operation.

The Wyoming State Legislature, meeting in 1943, recommended that funds heretofore used to operate the then current seven farms be used for only four farms during the ensuing biennium. In compliance with this suggestion, a Planning and Operating Committee from the staff of the Wyoming Agricultural Experiment Station was appointed in the spring of 1943 to make recommendations to the University Board of Trustees. The Planning Committee selected the farms at Afton, Archer, Gillette, and Torrington as being most useful to the agriculture of the state, and proceeded to lay out for these stations a program of more adequate experimental work. The University Board approved the recommendations of the committee. The proposed plan of operation recognizes the necessity for a long time program which will be beneficial to Wyoming’s agriculture in general, and specifically to agriculture in the areas near the substations.

The wise change in operational plan and the new viewpoint in regard to the functions and uses of the state farms already have given results. Specifically, the scheme of organization is more snug; the cooperation of local groups in planning the work of the stations is better understood; the expenditure of available funds is more effective; and the full interest and participation of the technical staff at the central experiment station in Laramie has been secured. In these respects sharp progress has been made during the current biennium.
SUBSTATIONS IMPORTANT IN RESEARCH PROGRAM

The use of state farms in connection with central agricultural experiment stations is recognized as an efficient means for enlarging the scope and effectiveness of agricultural research. Particularly in a state such as Wyoming, where differences in climate and topography are so great, experimental substations have become an important adjunct to adequate programs of research.

Progress in agricultural research in the United States, even in advance of the need for greatly increased production to meet total war, has been striking. Improvements in communication, transportation and in the industrial world have, perhaps, minimized agriculture's accomplishments. Because of the universal use by nearly everyone, new industrial inventions and their applications have tended to overshadow important discoveries in crop production, animal improvement, land utilization, nutrition and the conservation of the soil. Nevertheless, the march towards more efficient crops and livestock has gone forward steadily under the leadership of the various research agencies. Among these agencies the branch station, or state farm, is an important and integral part.
Among the more striking advantages which accrue to a program of agricultural research from a system of state farms, the following, which apply especially to Wyoming, should be recognized:

(1) No area includes a greater variety of soil types and climatic conditions than that found within Wyoming’s borders. Since the efficiency of both crop and animal production depends greatly upon soil and climate it is imperative to have auxiliary experiment stations located in at least some of the areas of widest variability. With Wyoming conditions varying from the sparse verdure of the upland desert to the lush acres in the irrigation farming sections, state farm experimentation is indeed essential.

(2) Because experimental procedure cannot always control such variables as the quality of seeds and feed, the health of experimental animals, unseeable heritable differences and other unpredictable factors, it is considered to be necessary experimental practice to repeat the experiments until a reasonable assurance is had that the results are significant and reliable. A system of state farms makes it possible to hasten greatly the release and publication of new discoveries by conducting the same experiments simultaneously at several substations. Results thus obtained at four substations in one season are comparable with four years of experiment at one station. In the case of crop tests a devastating hail storm or local drought may destroy the results at one station without retarding the research program seriously, since similar experiments are being conducted at the same time at other stations in the state. During 1944 the test plots for the study of potato and bean diseases at Laramie were seriously injured by frost, but the Torrington plots were unharmed.

(3) Proximity to any project generally results in greater interest. The farmers and ranchmen in areas near the substations are usually the first to take up new discoveries and methods. In other words, there is considerable demonstration value to state farms or substations which constitutes an important part of their usefulness. In Wyoming the state farms are greatly aided by committees of local citizens who know the problems of the region.
Winter Wheat Yielding 20.79 Bushels Per Acre at the Gillette Station.

and are well prepared by experience to advise in planning the research and demonstration programs for a particular farm. Such local interest is very encouraging.

(4) The staff of the central station at the University is, without additional expense to taxpayers, used extensively in the conduct of experiments at the substations. Under the recent revision in the management of the state farms, they are actually a part of the Wyoming Experiment Station. The experts in various fields at the University are available for both leadership and responsibility in the state farm programs. As now constituted the Farm Planning Committee includes the Dean of the college; the Director of substations; the heads of the Agronomy, Animal Production, and Veterinary Science departments; the Director of agricultural extension; and the extension specialists in crops and livestock. The value and effectiveness of such a group to the state system of agricultural research cannot be overestimated.

A STATE-WIDE PROGRAM FOR WYOMING

The ideal system of substations for any state probably should include a farm in each area which differs materially from any other area. The cost of such a system would, however, be pro-
hibitive. A more practical arrangement is to have substations located in the areas which differ most widely, such as are representative of dry-farming, irrigated-farming, desert grazing, plains country, and the mountainous districts where the growing season is shortest. While Wyoming has not completely met these requirements for location, it is maintaining farms in several of the typical areas.

The Afton farm, in the high mountains of western Wyoming, is located in a region which depends upon a combination of dairying and irrigated farming for agricultural success. In southeastern Wyoming the Archer station, operated in cooperation with the United States Department of Agriculture, serves the dry farming and plains grazing regions. The irrigated farm near Torrington is located in an area where the growing of sugar beets, corn, potatoes, beans, and the feeding of livestock are important agricultural activities.

It is hardly necessary to point out that the mere existence of a state farm is insufficient reason for its being. Frequently during the history of the state farms in Wyoming there have been periods when the funds available to the farms were so small as to preclude any actual experimental work. Although the operation of these farms under a reasonably modern system of management,
without experimentation, may demonstrate what can be accomplished under similar conditions, the farms will in no way fulfill their destiny unless used for the conduct of research and experimentation as well as for demonstration. It is the belief of the Planning Committee that if sufficient funds are not available for the maintenance and effective operation of any farm, that farm should be closed. This same attitude was expressed by the 1943 Legislature when it recommended the reduction in the number of state farms from seven to four. However, this attitude does not indicate agreement that four substations are sufficient for an adequate state farm system for Wyoming. It is probable that Wyoming appropriates less money for substations than any state in the Union with equal agricultural interests.

The confidence and support of local farmers and ranchmen in the region surrounding any substation are highly important to the station's success. The Planning Committee recognizes that support is partially dependent on confidence, and since that con-
fidence must be earned, the committee accepts, given adequate funds, the responsibility for satisfactory local contacts. In all frankness, it should be remarked that local interest sometimes has taken the direction of insistence on proof of some preconceived idea of a production practice or method. Frequently the idea is not capable of proof, or has already been disproven by some other experimental agency. Of course, in this instance, the responsibility for clearing up the situation rests with the staff of the experiment station and the state farm office. That they generally have been able to do so is evidence of good faith all around.

Aside from the opportunity for replication of experiments which a state farm system provides, there exists the additional advantages presented by a coordinated research program. An example may serve to make this point clear. For several years the central station at Laramie has been studying the progeny of standard type registered Hereford bulls to see how calves vary in efficiency of gain, yield of wholesale cuts of beef, and in quality.
With the advent of the Comprest type of Hereford cattle, it has become imperative to learn about that type's efficiency and quality as a meat animal. The equipment and facilities at the central station are not sufficiently extensive for conducting the Comprest studies with the speed which the situation demands. There are at the Gillette station, however, facilities for maintaining a Hereford cow herd, and so a group of registered Hereford heifers has been obtained and are being bred this fall to Comprest Conqueror, the foundation sire of the Comprest type. The calves from these matings will be fed out and studied at Laramie, where a meat laboratory and other facilities are already available. Replacement calves of standard type will be sent to the Gillette Station for a continuation of the series of feeding experiments which have been under way there. This example of coordinated experimentation, which a system of substations makes possible, illustrates the great possibilities in this direction. Another example is the simultaneous testing of seeds in several localities in the state, or a comparison of cultivation methods on dry land soils of different types during the same season.
ACCOMPLISHMENTS AT THE AFTON STATION

At Afton registered Holsteins are replacing the remaining grades. The program to obtain accreditation, free of Bang's disease, is under way. The flock of registered Corriedale sheep has been included in a breed improvement study and the first lamb crop under the new arrangement secured. Tests have been started to determine efficient methods for the application of irrigation water, including the proper amounts and the frequency of application for grain and forage crops. Below is a list of the studies now being conducted at the Afton substation:

- Barns vs. open sheds for dairy cattle.
- Different methods of pasturing dairy cattle.
- The influence of grass silage on milk production.
- Rations for dairy calves.
- Breeding studies with Corriedale sheep.
- Varying protein and scratch grains in poultry rations for egg production.
- Varietal tests with small grains.
- Studies with irrigation water.

Variety poultry rations are tested for economy in egg production—Afton Station.
PROGRESS AT ARCHER

At Archer additional pastures have been fenced for testing the effects of rotation and deferred grazing and the influence of different intensities of grazing upon the native forage. The experiments indicate that lambs make greater gains on dry land pastures seeded to crested wheat grass or western wheat grass, than they do on mixtures of either of these species with Blue Grama and Russian wild rye grass. The eccentric one-way disk developed at Archer has increased the certainty of cropping on non-irrigated land, and has reduced the cost of production. It is now being used to increase forage yield on the natural range. Lambs pasturing on land treated with this disk have made gains as much as sixty per cent greater than those for lambs pasturing on adjacent non-treated land. The following specific projects are under way at Archer:

- Dry land crop rotations for southeastern Wyoming.
- Seed bed preparations for spring and fall crops.
- Trees and shrubs for shelterbelts in Wyoming.
- Methods for increasing the carrying capacity of native range land.
- Pasturing sheep on introduced and native grasses.
Seeding methods and dates for dry land grasses.
Influence of fall moisture on the grazing capacity the following season.
The influence of rotation and deferred grazing on native range land.

NEW HEREFORD HERD AT GILLETTE

At Gillette, besides the new herd of registered Herefords mentioned previously in this report, nearly all of the land recently added to the farm has been cleared of cheat grass and seeded to crested wheat grass and a new variety of forage called Russian wild rye grass. The land has been cross-fenced into test pastures for a comparison of different grazing methods. Among other improvements are a new well with windmill and tank for watering stock, and a new cattle shed. The following projects are under way at Gillette:

Seeding methods for spring and winter cereal crops.
Varietal tests with grass and legume species.
Seeded pastures vs. native range for beef production.
Wintering rations for calves.
The efficiency of “Com prest” vs. conventional type Herefords.
Tree and bush fruits for Wyoming.
Hybrid Corn Plots at Torrington.

IMPORTANT EXPERIMENTS AT TORRINGTON

At the Torrington Station feeding tests with cattle and sheep have always been an important activity. Recent experiments indicate that gains in weight made by steers and heifers on alfalfa pasture with a limited grain ration are equal to those made in a dry lot. Whether this comparatively valuable crop land may profitably be used for pasturing has not yet been determined. The use of green alfalfa for ensilage is being studied for the second year. The ensilage is being fed to lambs in comparison with other feeds. Various methods of ensiling the alfalfa are also being studied. A herd of registered Hampshire hogs is being established and the progeny are used to test various substitutes for animal protein in the ration for fattening pigs. Numerous projects are under way with chicks and laying hens.
Important agronomic experiments are being conducted at Torrington which is located in the heart of a rich farming area. The resistance of sugar beets to insect pests and diseases; seed certification work for beans and potatoes; the testing of barley varieties; and the studies with varieties of soy beans are among the important projects.

Project titles include the following:

- Grass and alfalfa pasture vs. dry lot feeding for beef cattle.
- Fattening rations for beef calves.
- The use of alfalfa silage in lamb fattening rations.
- Protein substitutes for pigs.
- Studies with chick hatching.
- Methods and time for seeding sugar beets.
- Sugar beet disease resistance.
- Varietal tests with cereal grains.
- The control of disease and pests of potatoes.
- Control of the Mexican bean beetle and bean rust.

Lamb Feeding Experiments at Torrington Have Produced Favorable Results.
FEDERAL COOPERATION

In addition to cooperative work carried on at Archer, where the salary of the superintendent is paid from Federal funds, the Planning Committee is cooperating in various methods for increasing the carrying capacity of range land in the Church Buttes area of the Red Desert. A tract of land has been fenced into pastures and provided with water holes. Additional grass seedings have been made, and the land is being pastured to determine the most efficient methods of handling the grazing. The support and interest of the Grazing Committee, District Number 4, Taylor Grazing Service has aided materially in the work of this project. At the Sheridan Field Station all operating costs are carried by Federal funds. The title to the land is in the State of Wyoming, and the receipts from miscellaneous sales are administered by the University of Wyoming.

A SUBSTATION NEEDED IN THE BIG HORN BASIN

An adequate research enterprise serving the Powell-Garland-Byron-Cowley area in the Big Horn Basin is essential if the State Farms are to meet effectively Wyoming’s agricultural experimental needs. This extensive area represents about a quarter of a million
acres of fertile, irrigated farm land, not at present served by a substation in our own or an adjoining state. Although the staff at the main station has attempted some work on the problems of the soil, plant diseases and crop improvement in this area, they have been handicapped by having to rely entirely on cooperative projects with farmers and ranchers, a method which does not afford complete experimental control. It is too much to ask private individuals to shoulder the costs and losses which go invariably with the research process.

At one time the Basin area was an important producer of potatoes. Now, both yields and quality of that crop have dropped very low, seemingly the result of disease which might have been controlled if studied in time. Bean diseases now prevalent in the Basin require intensive study in order to prevent a situation similar to that for potatoes. The livestock and feeding problems of this area demand attention, as do those dealing with soils, irrigation and drainage. In a relatively new reclamation project such as this plant breeding and drop improvement research are of vital importance.

For several years the Big Horn Basin has been studied and surveyed by the University with a view to determining the best location for a substation in that area. Long ago the conclusion was reached that Powell affords a suitable location. An acreage adjoining Powell, owned by the U. S. Reclamation Service, has been tendered to the University on a permanent lease to be used for the establishment of a substation. It seems imperative to those conversant with the situation that funds for the establishment of a Big Horn substation be provided.
The following publications of the Wyoming Experiment Station may be had upon request: (Revised list, February, 1944).

BULLETINS—
163. Results with Tree Planting at the Sheridan Field Station.
185. Barley Tests at the Sheridan Field Station.
205. Economic Studies of Irrigated Farms in Big Horn County.
209. Forty Years of Weather Records.
216. Sugar Beet By-Products for Fattening Lambs.
221. Occurrence of Selenium and Seleniferous Vegetation in Wyoming.
223. Corn Production on the Campbell County Experiment Farm.
227. Sugar Beet Tops, Cottonseed Cake and Mono-Calcium Phosphate in Rations for Steers.
228. Type of Farming and Ranching Areas in Wyoming.
229. Vegetative Composition, Density, Carrying Capacity, and Grazing Land Values in the Red Desert Area.
231. Poisonous Plants and Livestock Poisoning.
232. Breastbones of Turkeys.
234. Cellar Wintering of Bees.
236. Hybrid Corn Adaptation Trials in Wyoming in 1939.
237. Roughage Feeding of Dairy Cattle.
238. Wintering Bees in Wyoming.
239. The Two Queen Hive and Commercial Honey Production.
240. Salinity Conditions in the Big Horn River during the Years 1938 and 1939.
243. Practical Results from the State Experiment Farms.
244. Bacterial Ring-Rot of Potatoes.
245. Sulphur Dusting for the Control of Psyllid Yellows of Potatoes.
246. Hybrid Corn Adaptation Trials in Wyoming, 1940.
248. Influence of Cereal Grains Upon Quality of Meat in Turkeys.
249. Coccidia Infesting the Rocky Mountain Bighorn Sheep in Wyoming.
250. Vegetable Culture and Varieties in Wyoming.
252. The Control of Chlorosis in Cottonwood Trees and Other Plants.
253. Range Forage Production in Relation to Time and Frequency of Harvesting.
254. Crossbreeding for Lamb and Wool Production.
255. Lungworms of Domestic Sheep.
256. The Use of Wheat in Livestock Feeding.
257. Utilizing Self-Feeding Methods for Fattening Lambs on Sugar Beet By-Products and Other Home-Grown Feeds.
258. The Wyoming System for Scoring Corriedale Sheep.
259. Life History of Sarcosporidia, with Particular Reference to Sarcocystis tenella.
260. Dusting for Potato Psyllid Control.
262. Economic Importance of Sarcosporidia with Especial Reference to Sarcocystis tenella.
263. Feeding Dairy Stock in War Time.
264. The Influence of Protein Concentrates Upon the Quality of Meat in Turkeys.
265. War Time Feeding and Management of Hogs.
266. Avian Leukosis and Lymphomatosis.