



59th  
**REPORT**



wyoming agricultural experiment station  
laramie 1948-49 wyoming

# *Fifty-Ninth Annual Report*

of the

WYOMING AGRICULTURAL  
EXPERIMENT STATION  
1948-49

By JOHN A. HILL, *Director*  
and  
GERALD JENNY, *Editor*



UNIVERSITY OF WYOMING  
LARAMIE

## CONTENTS

	Page
Dryland Pastures .....	3
Range Management .....	5
Small Grains .....	7
Corn .....	9
Potatoes .....	10
Bean Production and Diseases .....	13
Weed Control .....	14
Poisonous Plants .....	15
Soils .....	17
Agricultural Economics .....	18
Beef Cattle .....	21
Sheep and Wool .....	21
Poultry .....	24
Animal Diseases and Parasites .....	25
Insect Pests .....	26
Honey Bees .....	27
Foods and Nutrition .....	30
Branch Experiment Stations	
Afton .....	32
Archer .....	34
Gillette .....	36
Powell .....	37
Torrington .....	37
Weather Report for 1948 .....	40
Changes in Personnel .....	45
Publications .....	45
Financial Report .....	47
Station Staff .....	48

## DRYLAND PASTURES

### Best Pasture from Crested Wheatgrass and Alfalfa

At the Archer branch research station, the dryland pastures have passed through 10 years since seeding. Good ground cover has been maintained by all species throughout this period. The western wheatgrass, blue grama, and buffalograss provide better cover than the cool-season bunchgrasses.

At Archer the crested wheatgrass together with alfalfa continues to be the best pasture we have from a grazing standpoint. Russian wildrye is turning out to be an excellent grass for summer, fall, and winter use. From all indications, the wildrye has stayed highly palatable through fall and winter. Chemically we find it high in protein, calcium, and phosphorus during winter—just a good pasture crop.

Crested wheatgrass is the best grass for spring use. The standard strain looks better than the fairway strain.

Western wheatgrass makes good late-spring and summer pasture. For early spring it doesn't do nearly as well as crested wheatgrass. But as ground cover, western wheatgrass is superior to all species included in

this study—except blue grama and buffalograss.

Where blue grama grows together with buffalograss, sheep turn up their noses to the buffalograss. They don't like it.

1948 was a dry season and it reduced the grazing capacity of these seeded pastures to a point not much different from native range. You don't judge from one year's results. We can report here a 7-year average that includes the dry 1948. These seeded pastures have supported from 2 to 2.8 times as much grazing as did the native range during the same period.

At Laramie, duplicate pastures, five acres each, were seeded in 1947 to intermediate wheatgrass, to crested wheatgrass, and to alfalfa. These pastures carried 55 sheep days, or about two sheep months per acre during 1948.

Sheep on these pastures showed much preference for intermediate wheatgrass. Our agronomists found that, in pastures where volunteer crested wheatgrass occurred, it was generally passed over in favor of the intermediate wheatgrass. That was the only difference observed on these three pastures.

From these results we are pretty well convinced that ranchers in this area (Southeastern Wyoming) should make greater use of grasses. Legumes should be a part of the seeding to get maximum production over a long period.

### **More Lamb Gains from Rotation Grazing**

After four years of trials our agronomists are convinced that greater lamb gains per acre may be obtained with a rotation system of grazing. At Archer three pastures were grazed in rotation. Each pasture was grazed a week at a time, then allowed to recover before regrazing. This made it possible to graze at the rate of 62 sheep days per acre, as compared to 47 sheep days on a continuously grazed check pasture. The rotated pastures produced 27 pounds of lamb gain per acre, while the check pasture produced 22 pounds of gain. Besides, a greater amount of forage was left on the ground at end of the grazing season on the rotated pastures than on the check.

In addition to the rotation grazing studies, we are conducting trials on intensity of grazing at the Archer Field Station. Here we aim to determine the effects of different rates of use by sheep upon the vegetation composition, the animal gains, and the time it takes before deterioration becomes noticeable under heavy use.

Duplicate pastures for each rate of use have been grazed by sheep for a 5-year period. These were grazed so that the short grasses on the lightest-grazed pastures were

utilized to within 1.05 inches of the ground level. On the medium-used pastures, the short grasses were used to within 0.8 of an inch of the ground level, and on the heaviest-grazed pastures they were used to within less than 0.6 inch of the ground level.

After five years of grazing to these degrees, there has been little evidence of change in vegetation. The lamb gains per head have been slightly lower on the heaviest-grazed pastures than on the lightest-grazed pastures. The lamb gain per acre was higher on the heaviest-grazed pastures. This does not mean that heavy grazing is recommended over long periods. It merely shows that the short-grass ranges of Eastern Wyoming appear to be quite resistant to heavy grazing by sheep.

These are cooperative projects between the Agronomy Department of the University, the Soil Conservation Service Research Division, and the Bureau of Plant Industry, Division of Soils and Agricultural Engineering.

### **How Get New Pasture Species?**

Wyoming has some 175 native species of range and pasture. Very few of them have been tested for production in terms of animal gain, or studied in terms of life history, or observed in any way in experimental nurseries. In addition there is a steady increase—in the discovery through exploration and in the development through genetics—of new range plants. This makes it necessary to evaluate constantly through nursery trials. Those proving of high value in nursery work are further studied to

discover the best means for establishing them on the range. Promising native species now under examination include *Festuca kingii*, *Festuca thurberi*, and *Danthonia parryi*. Promis-

ing introduced species now being studied involve a variety of wheatgrasses including tall, stiffhair, intermediate, and crested.

## RANGE MANAGEMENT

### More and More Ranchers Are Pitting Their Pastures

At the end of the 1948 growing season our soil conservationist made a trip over the state to inspect range pitting trials. In talking with the ranchers he learned that the pitting had increased their forage production. In the shortgrass plains area these estimates ran as high as a 100 percent increase after pitting.

Detailed studies on some of these pitted areas show that, in the shortgrass plains type, the pitting stimulated seed production on all species. It also increased the density of cool-season midgrasses, particularly western wheatgrass.

It appears that the type of soil has less to do with pitting results than does the make-up of the vegetation. On sagebrush-wheatgrass types of range, the effects of pitting were not so pronounced.

In 1948, for example, our experimental pastures again showed a marked advantage for pitting. The pitted and grooved pastures carried 30 to 40 percent more sheep, compared to non-treated pastures. More grass was left at season's end, too.

It appears that the pitting treat-

ment has a longer life than was expected. After 10 years in one group of pastures, you can still see advantages in composition of the cover and also in grazing capacity.

From all this research we are convinced that pitting is a dependable improvement practice on the plains where the cover is mostly blue grama and buffalograss and where 5 to 10 percent of the cover is made up of several cool-season midgrasses such as western wheatgrass, Junegrass, needle-andthread grass, Sandberg bluegrass, and carex.

Ranchers are showing more and more interest in the range and grass studies at the Archer and the Laramie stations and in the field trials over the state. You can find more and more ranchers pitting their pastures—and doing it on their own initiative. Soil Conservation gets far more requests for pitting machines than it can handle.

Vegetative studies made in 1948 show that the pitted pastures still support a density of western wheatgrass that is nearly double the density found on the adjoining checks. There is western wheatgrass plus other cool-season midgrasses, and these account pretty much for the

greater carry-over of vegetation each year on the pitted pastures, even when they are stocked more heavily.

The range and grass studies at the Archer and Laramie Stations are in

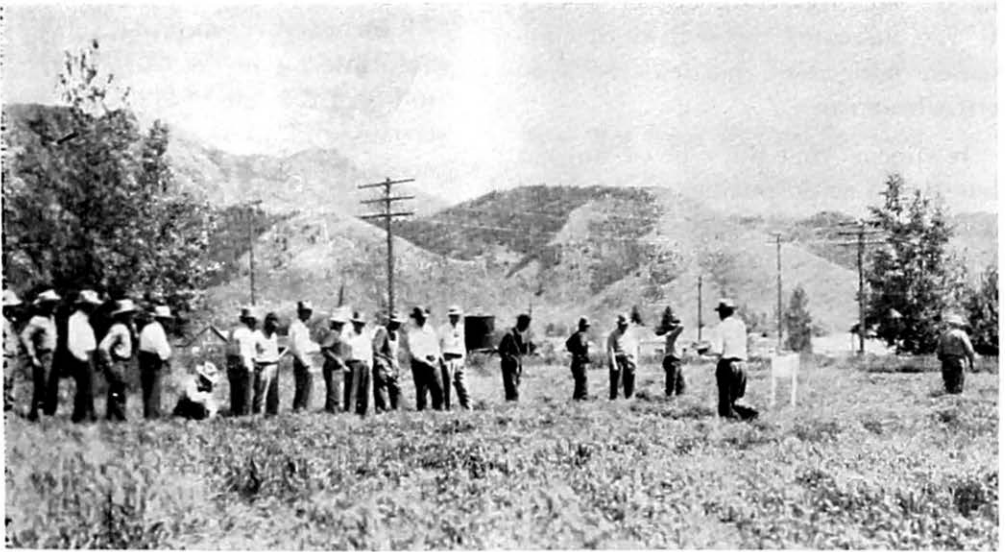
cooperation with the Research Division of the Soil Conservation Service and with the Bureau of Plant Industry, Division of Soils and Agricultural Engineering.

### **How Much Water Do Irrigated and Mountain Meadows Need?**

We have begun a far-reaching investigation in irrigation. In two basins our engineers are investigating the use and application of water to mountain natural grass meadows. They are doing the same for reseeded grass meadows. The Green River and the Laramie River Valleys are the centers.

In the Laramie project 45 plots, each 40' x 100', will be set up. After this is established, the Pinedale project, with 75 plots measuring 50' x 100' each, will be started.

One important phase of this sizeable project—one that has not had too much consideration—is the most economical method of preparing sod-bound meadows for reseeding.



A few of the 400 persons who attended the annual Field Day in June 1949 at the Afton Field Station in the Star Valley. Here they are inspecting alfalfa plots



Barley in fertilizer trials at Torrington. On the left, superphosphate was applied at rate of 125 pounds per acre. The crop did much better with 230 pounds of ammonium nitrate, as seen on the right

## SMALL GRAINS

### Marquis Good in Grandfather's Day—But Now?

It is the business of the Experiment Station to test hundreds of selections and variety crosses of small grains so that the very best will come out that the soil and the climate can support.

First a large number of numbered selections are planted in a "selection nursery." The poorest producers are omitted in the next planting, which we call a "variety and selection nursery." Again the best are chosen and planted the following year in "advanced plots."

Each year, likewise, 17 of the best selections are planted in an advanced nursery. Best springwheat yielder for 1948 was Onas with a 45.3 bushel average. Four nearest competitors, including Thatcher, ranged from 40.4 to 37.4 bu.

Onas did so well because that variety was singularly free from rust that year. It is the only white spring wheat used in our trials and we aren't likely to recommend its use, since it has a soft kernel adapted to conversion into macaroni. It is not a baker's variety and besides, it won't do so well when there's a heavy infestation of rust. And a word about Marquis. That variety was popular in grandfather's day and it still is grown generally but we have long ago developed varieties of spring wheat that have far outstripped old Marquis.

And so go our tests year after year. Always we replant the best of the previous year. When certain varieties have yielded consistently well over several years, we are ready to produce them in quantity for distribution by the Wyoming Crop Improvement Association.



## There's a Better Winter Wheat than Yogo

In the area of winter wheat we test varieties for winter hardiness. Yogo has long been known for its resistance to cold with a record of around 95 percent survival. In our 1947-48 trials, however, several selections, all of them owning Minhardi for a parent, went better than Yogo. Two selections showed 98.0 percent survival, one, 97.0, and one went as high as 98.3 percent. We'll keep turning these selections over in succeeding years in the hope of developing a wheat that will have a superlative degree of cold resistance.

## Best Oat Not Yet Known

Numbered selections took the lead in the advanced plots in oats in 1948, with 1/80th-acre plots replicated seven times. Yields of 72.8 bushels were realized, followed by 69.5, 68.0, and 64.8 bu. (the latter by the Carleton variety).

That was under dryland conditions. Under irrigation the same three numbered selections again took the lead, with acre yields of 78.3, 75.3, and 69.0 bushels. Overland variety was in fourth place with a yield of 66.7 bu. Here again we must run our tests several years in succession before we can recommend varieties and give them a name.

## 125-Bushel Barley Is Possible

In 1948, 936 acres of certified barley were grown in Wyoming. Sixty percent of this, or 562 acres, carried Frontier, a variety released from the Agricultural Experiment Station in 1946.

The 1948 season was very dry and



A nursery thresher built especially for measuring the yield of grain in an experimental row a rod long. The machine can be hitched to a car for hauling. It sets up in a minimum of time. A conversion table on the side tells directly how many bushels per acre the grain will rate—and it even weighs the sample of grain and gives the weight of that variety per bushel.

generally unfavorable for production of small grains. We had to irrigate the barley plots four times. In our advanced plots a numbered selection made the best showing—125.7 bushels to the acre. Gem was next with 117.6 bu., followed closely with a selection (117.2 bu.), with Frontier trailing at 111.0 bu.

Each year the Experiment Station cooperates with the U. S. Department of Agriculture in maintaining two nurseries.

The Rocky Mountain nursery was composed of 24 varieties and selections. Best yielders ranged from 130.4 to 121.0 bushels, with Lico in the middle at 123.5 bu.

Twenty varieties were tested at the Great Plains nursery (dryland). Yields

ranged from 68.5 to 59.0 bu. for the best five selections.

## HYBRID CORN

### Different Altitudes— Different Hybrids

The search for varieties of hybrid corn that are adapted to certain climatic conditions goes on apace in various parts of the state. Torrington, Worland, Wheatland, Gillette, and Sheridan are the points where trials were carried out in 1948.

Our agronomists determined moisture content by testing samples of grain which they collected when harvesting the ear corn. Moisture percentage tells how close to maturity a hybrid may be. (In the Worland trials the samples were not taken until two weeks after harvest.) Grain-yield figures were corrected to read for 15 percent moisture.

In some of the trials the results show that several hybrids produced more grain, green forage, and dry forage than the best adapted local variety produced as a check.

At Torrington (4100 ft. elevation), where irrigated land was planted May 15 to numerous selections in the medium-early, medium, and late groups, Minnesota 13 was the local variety used as a check. It yielded 62.5 bushels per acre. Only four selections did significantly better, and they were all in the late group: United 32, 100.5 bu.; Wisconsin 595, 96.4 bu.; United 28, 91.0 bu.; and United 26, 86.4 bu.

Thirteen other hybrid varieties competing with the check ranged from 82.4 to 65.5 bushels against only 57.2 for Minnesota 13. Colorado K-4 was the best yielder and there were five others that made over 73 bushels.

At Worland, where the altitude is 4061 feet and the land is irrigated, early, medium, and late groups were planted May 12-13 and compared with the same Minnesota 13. This check produced only 31 bushels of corn. In the early group, five selec-

Hybrid corn does well on irrigated land—but what hybrid? Torrington is testing them





Soils technician tests one of many soil samples for nitrogen, phosphorus, potash, lime, acidity, soluble salt, and percolation

sease, taken from infected tubers of these four varieties. The results again showed that ring-rot infection in a resistant variety of potatoes is no more virulent than that found in a susceptible variety.

When resistant varieties of potatoes were inoculated with ring-rot bacteria, no symptoms were noticed in the plant; just the same, the stems may carry the bacteria for a period of years. Some plants and tubers may lose this infection, while others may continue to carry it.

Also, with susceptible varieties like the Bliss Triumph, the dosage of bacteria may be cut down so low that no plant symptoms can be seen the first year or even the second or third year after inoculation. Eventually the infection may build up enough to make the disease show up.

This means that any line of seed potatoes may be carrying ring-rot bacteria in small numbers, and symptoms of the disease may not be visible until the first, second, or even the third year later.

In attacking the problem from another angle our agronomists have taken to sterilizing the potato sacks. Burlap is an excellent carrier of the ring-rot germ and I suspect that the trade is barely aware of that source of the disease. In our experience, where the bags were allowed to hang in the bright sun for 55 days or longer, all bacteria, it seems, were killed.

So while you're waiting for research to catch up with the problem of ring-rot, it will pay you to begin with sterile bags. Our researchers are still far from the goal and must go through much more work before the problems can be entirely solved.

## BEAN PRODUCTION AND DISEASES

### Three Possible Attacks on Bean Diseases

Bean diseases can be attacked from one of three directions—you can fight the disease after it has become established in the planting (that is the poorest method); or you can start with treated seed that should give a clean plant; or you can plant disease-resistant varieties.

But the method can't be set up overnight. It takes years of patient experimenting with different dusts to find a product that will attack the disease in the growing plant. Our plant pathologists have been working with dusts in the plantings at Powell, Torrington, and Laramie. For blight control they have used Bordeaux (13% copper), copper oxychloride (5%),

Yellow Cuprocide (5%), Dithane Z-78 (6%), Balcoln's blight dust, and Parzate. At Powell the Bordeaux-treated plots produced by far the greatest yields and cleanest pods of Sensation Refugee beans.

Powell and Torrington figured in trials with sulfur for rust control. At Torrington Marlate, basic copper arsenate, pyrenone dust, rotenone, cyclonone-rotenone dust, and piperonyl-cyclonone dust were applied in combination dusts for control of rust and Mexican bean beetle.

Calcium cyanamid was used at Powell for control of white mold. Varietal tests also were carried out there for possible resistance to the disease.

Five different treatments were used on rust-resistant Pinto Bean seed at Torrington. These included Nitragin,

Office, laboratory, and greenhouse at the Powell Field Station in Park County. Established in 1947, this outpost of the Agricultural Experiment Station investigates the problem of bean diseases—among numerous other projects such as fertilizer tests, irrigation trials, varietal experiments, and soil analysis





Barley, shattered by hail, is studied during the Field Day in July 1949 of the Gillette Field Station (Campbell County)

tions yielded between 43.4 and 57.5 bushels; in the medium group, four produced from 43.8 to 56.5 bushels; four others in the late group yielded between 43.3 and 63.4 bushels. All these yields are significant increases over the check.

No advantage in yield was shown by any selection over Minnesota 13 in irrigated trials at Wheatland (4733 ft.). It produced 33.5 bushels.

The same results were obtained in the dryland areas of Gillette and Sheridan, where Falconer, a local variety, proved the best in the early, medium, and late groups.

It must be kept in mind that these results represent only a single year and can't be regarded as conclusive. It takes at least four years of trials before varietal recommendations can be made.

## POTATOES

### Test New Seedlings for Improved Potato

Torrington, Powell, Worland, and Afton, besides Laramie, are the seats where potato variety trials have been carried on for some years. That involves a large number of seedlings as well as standard varieties. These tests included some true seed of cultivated

as well as wild varieties that we imported from Peru.

Several lots of foundation seed of the Bliss Triumph variety were tested in our Laramie greenhouse for freedom from virus diseases. Tubers harvested there were planted in foundation seed plots. Our workers rogued those plots three times during the growing season.

Are the newer varieties adaptable to Wyoming conditions? These tests should tell. The tests with new seedlings are a necessary step in developing new and better varieties. Some 3000 bushels of foundation Bliss Triumph seed was produced in the state in 1948 and this seed was made available to the growers of certified potatoes of Wyoming.

### **Want Good Potato That Resists Scab**

There is much alkali in the soils of Wyoming and as you know, potato scab thrives under such conditions. That makes it highly important to search for potato varieties that will resist scab.

During 1948, 84 seedlings were tested in scab-infested soil at Laramie, under scientific methods of spacing and repeating. Of these, 25 seedlings were saved for further increase and testing. Out of these our agronomists

hope to develop a potato that, besides resisting scab, will yield well and cook to the right mealiness. We think we are on the way.

### **Sterile Sacks Are a Start in Ring-rot Control**

In the realm of plant diseases, where the cause can't be found directly, science has to step in and attack the problem from many angles. That may involve ways to produce the disease experimentally, the aim being to find a key to control of the disease so introduced.

Well, in the matter of potato ring-rot—and you know how serious that trouble can be to the crop—our specialists have been trying out several methods. For one thing they purposely inoculated tubers of Bliss Triumph, Burbank, Red McClure, and Teton with bacterial ooze—that is, with the organism causing the di-



**Roquing oats for seed certification at Torrington, Goshen County. Great care must be taken to assure a clean stand**

Nitragin - Spergon, Arasan - Nitragin, Spergon, and Arasan.

In selection tests with Pintos at Torrington, 21 selections were compared. There is a great deal of variation among Wyoming Pintos in relation to earliness, vining habits, and type of foliage, as well as size, color, and yield of seed. Some promising lines should be available soon.

Using snap beans and commercial varieties that show the most blight resistance will prevent much loss to growers. Using seed-treating materials, especially under poor growing conditions, also will help greatly. If streptomycin will get rid of blight in plants grown under field conditions, it will be worth while. In fact, it may prove to be a lifesaver to the snap-bean industry. With the higher resistance to blight found in a collection from the Federal Horticultural Field Station at Cheyenne, we hope to isolate some excellent varieties and strains. Crosses are also being made in the commer-

cial varieties; there we are trying to combine resistance to several diseases in one plant and still give it good quality and yield.

### **Constant Cropping of Field Beans Means Poor Yields**

Constant cropping of field beans on irrigated lands showed a decline in yields and also a worsening of soil conditions. We found better yields on farms where alfalfa and sugar beets were used in the rotation. Both physical condition and fertility of soil were bettered where feed crops and livestock were combined with cash crops.

We reseeded some abandoned farm lands with crested wheatgrass where 11 inches or more rain fell. This action increased the carrying capacity of the land far above that of the original native range. On such land, granted favorable topography and good soil, rotating the range may be one of the answers.

## **WEED CONTROL**

### **What To Do with Five Noxious Weeds**

The burning question in weed control through chemical killers seems to narrow down to a matter of concentrations and stage of plant growth.

For Canada-thistle control, our experimenters have treated plots one rod square with ester, amine, and sodium salt of 2,4-D. They used strengths of  $\frac{1}{4}$  pound,  $\frac{3}{4}$  pound,  $1\frac{1}{4}$

pound, and 2 pounds per acre in 1947 and again in 1948, treating all plants at bud stage. In each year they counted the number of thistles remaining and so established the percentage of survival.

So far they regard results as rather poor. But they are convinced that it takes at least 2 pounds of 2,4-D per acre—over several years—to get control of that pest.

We made the same trials on white top. Here we are surer of results after three years. Under Wyoming conditions, 2 pounds per acre of 2,4-D is far better than smaller amounts, and it must be applied at least for 2 years.

Russian knapweed is another noxious weed and it, too, has come in for research looking toward control. We

used the same three forms of 2,4-D as for Canada thistle and white top. Single treatments of 3 pounds per acre of amine gave 99 percent control. These were almost as effective as double treatments of the same amount (2 treatments on the same plot). This research is going on in the hope of finding the best form of the chemical that will assure weed kill.

## POISONOUS PLANTS

### **Can Trace Deficiencies to Trace Minerals**

There are trace elements in the animal body that must be replenished from what the animal eats—or else!

In this state are certain areas in which some elements are lacking in the soil. Hay produced on such areas is bound to be deficient in one or more critical elements. Samples of such forages are being analyzed in our chemical laboratories. The elements being considered include phosphorus, iron, manganese, molybdenum, sulfur, cobalt, copper, zinc, calcium, magnesium, iodine, potassium, and boron. (Not all of these, of course, are trace elements.)

“Trace” means trace; not just any quantity. That involves extremely fine methods of analyzing. Just to give you an idea what precautions and what painstaking work are required in determining trace amounts of elements, let me give you the picture:—All water, acids, and ammonia used in this research must be carefully redistilled

and preserved in bottles made of non-soluble glass. All glassware is cleaned with hot concentrated nitric acid, rinsed with redistilled water, and dried in the oven. Ground-glass joints must be extracted with dithi-zone to remove all possible traces of heavy metals. No solution may contact cork or rubber at any joint in these examinations.

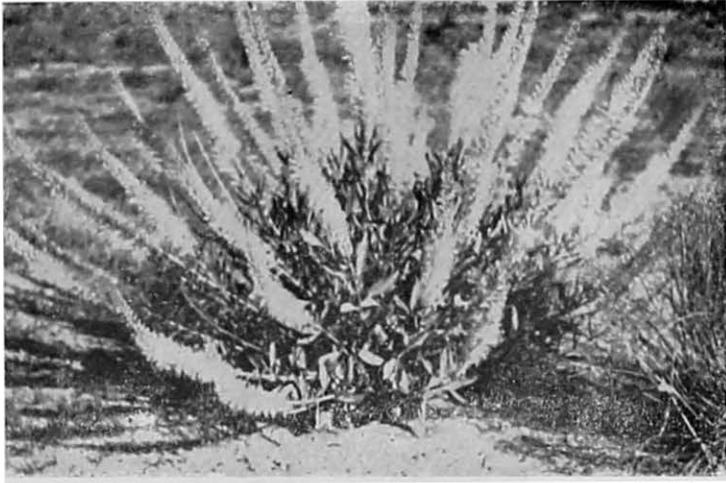
Once we know what trace minerals are lacking in forages, we can recommend treatments which will overcome nutrition deficiencies in the plants.

### **Give Them Protein and Vitamin A**

In the Saratoga Valley of South-central Wyoming, disease has struck the brisket of a good many cattle. One of the features of this ailment is that the liver and kidney are damaged in the same way that selenium would affect it. But blood tests usually show a small selenium value. There is evidence that mineral poisoning of some sort is present in the body.

The Vitamin A content of the





Prince's Plume—widely distributed poisonous plant, easily identified when in bloom

blood from these cattle was a little below normal; maybe the liver was not able to convert carotene into Vitamin A.

Our chemists also analyzed blood from 52 sheep grown near Rawlins. These sheep had grazed on a selenium-bearing range at least part of the year, and we felt it was important to get some facts just before the winter feeding program. We are not ready to announce the results, but we can pass on this observation: A high protein diet and plenty of Vitamin A are beneficial to stock that have grazed on seleniferous ranges.

It is impossible for us to tell how much farmers and ranchers have benefitted from this experimental work that we have carried on through the years. Nearly every day requests come for help, not only from Wyoming but outside as well. The U. S. Navy and the Atomic Energy Commission have requested our literature on this and other selenium subjects. The value of all this cannot be put in actual figures.

### Must First Learn

#### How Plants Behave

Greenhouse tests show that some native plants stand out in their capacity to absorb selenium—and it makes no difference whether the poison is in inorganic or organic form. However, it isn't common for a plant or a vegetable to carry all its absorbed selenium in an organic form.

Our chemists analyzed one *Astragalus*, variety *preussi*, that yielded a volatile liquid oil containing selenium. Unfortunately there wasn't enough of this oil to identify it, and the droughts of 1946 and 1947 just about wiped out the plant species.

We are in the middle of a long series of experiments in which we analyze a large number of plants for their selenium content. Our findings should give us a clue to the relation of plants to soil and to moisture supply in each case. No solution of the selenium problem is likely until we know more about the way plants behave where selenium is available.



Soils laboratory and tree-packing house at Torrington Field Station. Many farmers send samples of their soils here for analysis. Clarke-McNary trees are distributed from this station

## SOILS

### Soil-testing a Service to Ranch and Farm

The Department of Agronomy is operating a service that can of real help to ranchers and farmers who take advantage of it.

This involves a program of soil testing. Each year we make quick tests on about 500 samples of soil that are sent to us from farms, ranches, county agents, Extension workers, Soil Conservation Service personnel, etc. These tests are explained in a letter to the person sending the samples. Where possible, we make suggestions about farming methods or about using adapted fertilizers.

Besides that, our agronomists cooperate with other units or agencies in the use of fertilizers to boost crop yields. During the past year this cooperation included the branches of

the Experiment Station as well as the Great Western Sugar Company research station in Longmont, Colorado.

These two activities are important in developing interest in proper use of fertilizer. Growers are helped in choosing the best methods for coping with soil-fertility problems. The best rates and the best time for applying fertilizer are in this picture.

### Management Is Answer to Low Hay Yields

Better yield and better hay on native meadows lying at 6000 to 8000 feet elevation is a live problem on many ranches. Yields have gone down under a system which includes flooding or heavy irrigation in summer, stacking the hay in fenced ricks or bottoms in late summer, and pasturing the meadows in winter.

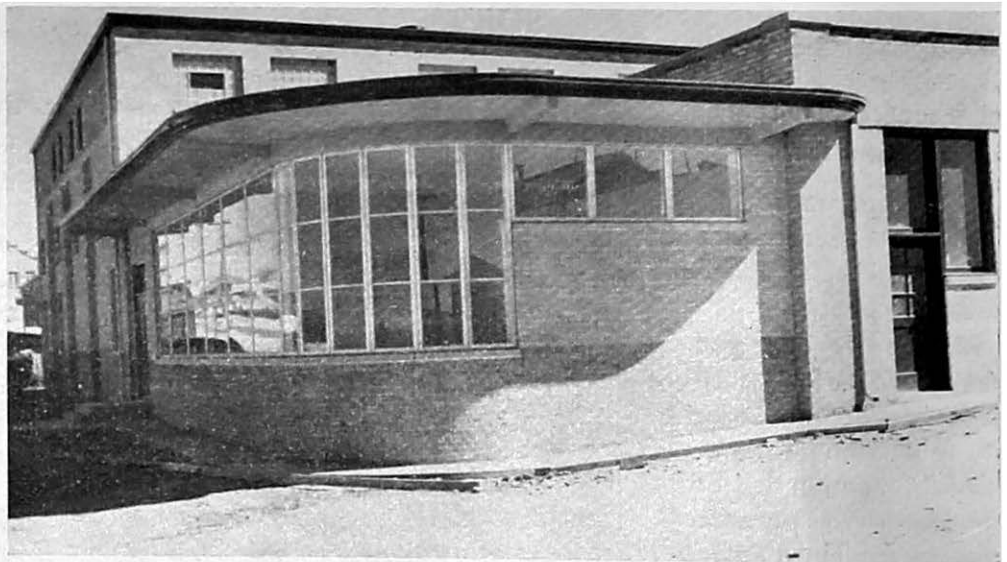
In 1947, Wyoming operators harvested 452,000 acres of irrigated hay. Total production was only 384,000 tons, or 4/5ths of a ton per acre. We have felt that leveling, reseeding, legumes, fertilizer, or control of water—or a combination of these—might double or even treble the average yield. That would make the ranchers' meadows more valuable.

Last winter (1948-49) our soilsmen made a greenhouse study of about 25 native-hay sods that were dug from native-hay meadows in the Lar-

amie Valley. Trials included reseeding with various grasses, salt removal by leaching, treatment with different commercial fertilizers, and processes with acid materials to aid in salt removal.

The grasses on these tiny plots were harvested four times during 10 months of constant irrigation. Our conclusion is that reseeding is possible without disturbing the original sod. We found also that nitrogen compounds and acid-loving agents went far toward bettering the yield of grass.

## AGRICULTURAL ECONOMICS



Sales room for dairy, meat, and poultry products on the University of Wyoming campus—a modern dispensary in the partially completed Agriculture building.

### Labor's the Big Cost Item

Labor costs in 1948 were 207 percent what they were in the 30-year period from 1910-1939, and seven percent over 1947 costs. "Other costs" averaged about 76 percent above the

same 30-year stretch and nine percent above 1947.

Ordinarily, labor takes up about 32 percent of the total cost of producing cattle and 34 percent in the case of sheep. In one year—1948—labor went

Up to 45 percent of cattle-production costs and up to 47 percent in the case of sheep.

This shows that a fair method to use in arriving at parity would be one that takes into account the step-up that has taken place in farm wages. The increase in "other costs" should count, too. Farm and ranch wages should be given the same consideration in arriving at cost of production (or parity) as accrues to industrial wages.

### **Horse on Way Out as Forager**

With surplus horses going at \$35 and cattle at \$141, it will pay Wyoming ranchers to convert their horse acres to carriers of beef.

Average prices received for cattle and calves in Wyoming's local auctions in 1948 were better than four times the prices that horses brought, according to our economists.

Since it takes more acres of range to carry a horse than it does to carry the average cattle and calf unit, it is easy to see the advantage of replacing horses with cattle on Wyoming ranges.

In a study of local auctions operating in the state last year, we find an average price of \$140.94 received for cattle and calves sold. This over-all figure includes dairy as well as beef cows—plus steers, heifers, bulls, and calves.

During the same period, the average price received per head of horses and mules sold through auctions was \$34.92. Here, again, the over-all figure takes in draft, saddle, and range horses as well as colts and a few mules.

Records show further that there has been a steady drop in numbers of horses and colts in the state in recent years—from 158,000 head in 1934 to 94,000 in 1948. If the trend continues, a point of balance may be reached soon. We must warn, however, against letting situations develop like those of last winter's storm period, when operators were caught short for lack of horse power.

### **New Revenue Sources for Local Government?**

Local units of government — town, county, and rural areas—are searching desperately for new sources of tax income; and no wonder! Their costs have gone up around 100 percent of the 10-year period of 1922-1932, while their tax revenue has increased only 35 percent.

So they are looking to the Federal Government for aid. Uncle Sam's income, through personal-income tax levies and other taxes, has gone up fourfold since that 10-year period.

In other words, local government units formerly received one-half of all the tax receipts in the country and now, only one-eighth.

And what of the agricultural producer? In 1922-1932 his personal-income tax was hardly worth mentioning; today it's three to four times his total general-property tax bill. No wonder he's not too keen about any increase in his general-property tax.

The producer protests that he pays enough taxes to carry on all functions of local, state, and national government. Now, he contends, *if there*

is not enough to pay for local government, let a portion of the tax he's paid to Uncle Sam be returned to his local unit.

And that makes sense.

### **Revolution on the Range**

With a 25c return per acre from beef cattle and only 11c from sheep, do you wonder that substantial shifts have taken place on the range?

In our experiments, grazing lands were used having a carrying capacity of 5 acres per animal per month or 60 acres for 12 months of feed. Results were as just mentioned.

Such an advantage of cattle over sheep has been largely responsible for the shift from sheep to cattle in grazing the West. In fact, this price differential has resulted in a drop of 45 percent in sheep numbers in 11 western states from 1942 to 1949. Cattle numbers went up 11 percent in the same period. In most cases, cattle have replaced sheep that left the range.

In the long pull there can be a moderate shift from one class of live-

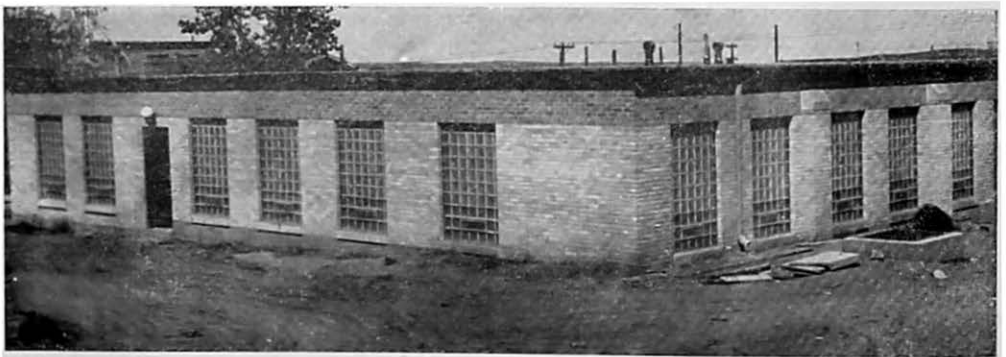
stock to another. Such shifts have proved profitable to producers on "intermediate ranges." By that are meant ranges that have a mixture of forage crops that may be used equally well by both cattle and sheep.

### **To Return a Profit, Stock Should Be Fed**

Our economists after studying the costs of 58 representative farms in Goshen County have come up with some figures on labor charges.

There are four main factors to consider in determining projects on these farms—size of farm, number of livestock fed, obtaining high yields, and efficient use of labor. The first two of these factors are the most important; in this study they accounted for about 60 percent of all the variation in labor income. And the effect of farm size on the year's income depended much on whether or not the stock was being fed in connection with the crop farming.

Our men found that feeding livestock is very important. An increase



**Modern wool laboratory, completed in 1949 for instruction and research in a vital part of Wyoming's agriculture**

in size of one acre produced a gain on the average of \$19.57 per acre—if only 5 animals were fed. But if 150 head were fed, there was a return of \$29.14 per acre.

Among the tenant farmers studied, 14 operators changed farms at close

of the crop year as against 23 farmers that stayed. Permanent tenants made a substantially higher labor income and fed 2½ times as much stock—and they had 10 percent higher yields than those that didn't stay put.

## BEEF CATTLE

### **Comprest vs. Conventional Type of Beef**

There is a difference in types within cattle breeds that is giving a good bit of concern to purebred and commercial cattlemen alike.

In this state are several breeders of "Comprest" type of cattle. A number of rangemen are using Comprest-type sires. Our animal husbandmen have been running feed experiments for two years with 12 sons of 3 Hereford sires. Of these, 6 were sired by the conventional type. The other 6 steers were sired by a Comprest-type bull. All of these steers have completed their feeding periods.

Our experience was much the same both years. The conventional type of steers—whether they were sired by conventional or by Comprest sires—made better gains in the feedlot—500 to 900 pounds better, in fact.

Of course, this sample was a small one. Still, the indications are that the conventional type of animal is more economical in the feedlot than its Comprest competitor, when both are grown to the same weight.

What all cattlemen should strive for, regardless of the type of sire used, is to cull out the slow-gaining type of steers.

## SHEEP AND WOOL

### **Differences That Can Touch Shepherd's Purse**

Sometimes it is hard to realize that differences exist in a flock of sheep—differences that spell profit or loss to the grower.

Some 10 cooperators in Southeast, Northeast, Central, and Northwest Wyoming have joined our Wool department in a 5-year study on culling, begun in 1949. This is encouraging

in view of last winter's severe weather, when great losses of sheep were sustained throughout the state.

On these ranches our men take measurements of fleece weight, staple length, girth, and body weight. The cooperators are finding out that sizable variations can exist in fleece weights and body measurements between cull ewes and reserve yearling and mature ewes.

**More Thickness—  
More Clean Wool**

Lamb production has become the most profitable phase of the sheep industry. That's why we have undertaken a project comparing the lamb production of Suffolk and Hampshire rams crossed on crossbred fine, medium, and coarse-wooled ewes. Also, we have measured the weights of clean wool and of lamb produced by such ewes. For this study we picked 300 mature range ewes.

You will want to know what results our experimenters got. First, from the shearing:

Wool type	Clean fleece weight in pounds	Fleece value
Fine	4.05	\$6.36
Medium	4.65	5.30
Coarse	5.35	5.35

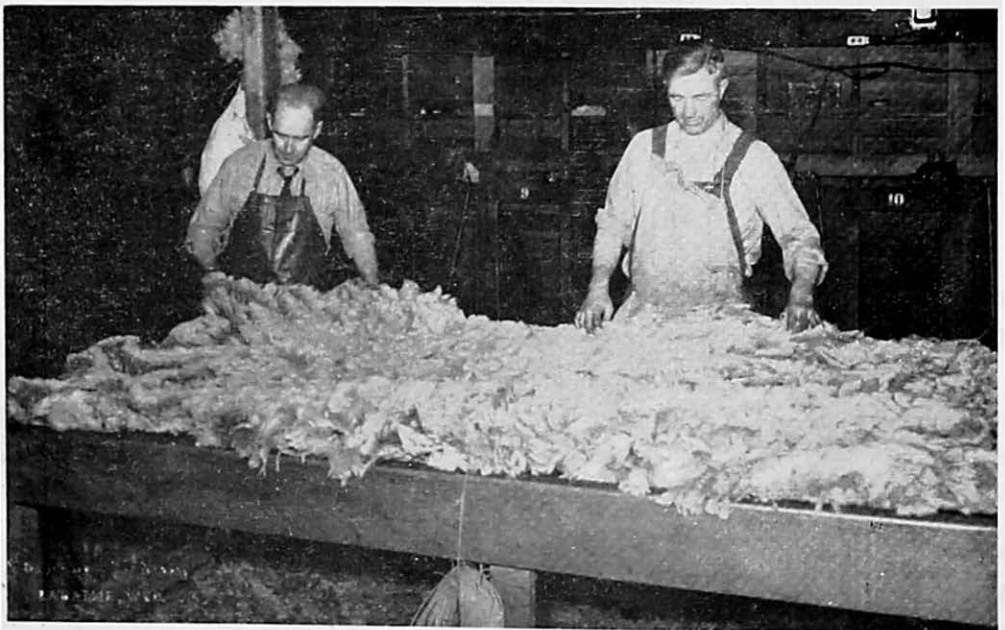
In general, as the wool types increased in thickness of fiber, the fleece had more clean wool. The fine-wool fleeces had the highest value.

Now for the results in lamb production:

1. The average weight of lambs produced with Suffolk sires was 103.67 pounds; Hampshire sires—96.98 pounds.

2. The total weight of Suffolk-sired lambs marketed was 15,240 pounds, compared with 13,965 pounds for Hampshire-sired lambs.

In the third division of our experiment we recorded the lamb production by wool type of ewes, but found only a few pounds of difference between the types. Lambs from fine-wool ewes averaged 99.22 pounds;



Skirting spread-out fleece on skirting table in shearing shed  
(Courtesy Farm Journal)



Shearing a selected ram at the Covey, Bagley, and Dayton Ranch, Cokeville

lambs from medium-wool ewes, 99.11 pounds; and lambs from coarse-wool ewes, 102.87 pounds.

So the coarse-wool ewes produced slightly heavier lambs than either the fine or medium-wool ewes.

The total income from both lamb and wool was the highest from the medium and short-wooled ewes, which gave practically the same income. The coarse-wool ewes produced the lowest income.

### **The Shorter the Wool, the Finer**

From mid-April to June 5, 1948, fleeces from 36,509 ewes, yearling

ewes, and rams, in four clips, were prepared for market by skirting and grading. This was done at the shearing pen in Walcott in Southern Wyoming. The fleeces weighed altogether 322,945 pounds.

Including black wools, an average of 12.5 percent of the weight made up the off-sorts. Net prices received for the clips varied from 49.04c per pound to 55.46c. The cost of skirting was estimated at 0.406c per pound. Grading cost was 0.275c per pound, and the total marketing charges per clip ran from 7.39c to 7.452c per grease pound.



Here are some facts worth mentioning:

1. Skirted fine and  $\frac{1}{2}$ -blood wools sold for 5c to 9c per pound better than similar unskirted wools.

2. Skirted medium wools realized a premium of 4c per clean pound.

3. Scoured tags and stained and skirt sorts realized net returns per grease pound of 22.05c to 25.75c. This return is considered to be 5c per grease pound above the value of the same off-sorts in the unscoured condition.

Fineness of fiber and staple length of samples were studied from samples taken at regular intervals through

shearing. Our sheepmen made these observations:

1. The shorter the wool is within a grade, the finer it is.

2. Measurements of diameter bear out the classifications by eye to a striking degree.

3. The staple lengths made of the lots were greater than the minimum standard lengths of the trade.

4. As the grades increased in diameter, the staple lengths increased

(In this experiment we are looking for improved methods of marketing one of the state's major crops—wool. It is financed through funds from the federal Research and Marketing Act.)

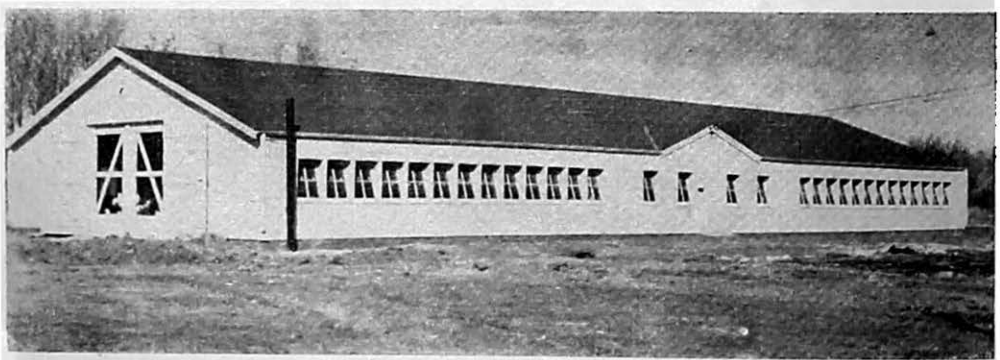
## POULTRY

### Low Oxygen—Low Hatch!

Ever since poultry has been raised in the Rockies, where the air is thin, growers have found that fewer eggs

hatch than on the seaboard or in between. Lack of oxygen is the reason.

Our poultry husbandmen have been trying to determine how much



New poultry house on Animal Husbandry farm of University of Wyoming. The building, 80 x 30 feet, holds two pens, each 30 x 30 feet, with roosts, feeding racks, and trapnests. Each pen holds 250 birds. The midsection of the building (20 x 30 ft.) is used as a feed-mixing room

improvement can be realized by adding oxygen. In some incubators they have added pure oxygen, in some a mixture of oxygen and carbon dioxide, and in some others, ordinary air.

Here is the percentage hatch for the three trials: pure oxygen—69.3 percent; mixed gas—66.0 percent; and control—54.0 percent. The difference between the pure oxygen and the mixed gases wasn't worth mentioning.

So it seems to be true that hatches can be stepped up in spite of high

altitudes. No Wyoming hatcherymen have added oxygen to their incubators, but several Colorado hatcheries have taken advantage of the discovery, and these have improved their hatches greatly.

In another phase of this experiment we are working with pressurized incubators. The purpose is the same—putting more oxygen into the air. Up to now we have had 26 percent better hatch where pressured air was used. We should have more to say about that next year.

## ANIMAL DISEASES AND PARASITES

### Pasture Sheep More Subject to Internal Parasites

There is a vast difference between sheep grown on pasture and those raised on the range, when it comes to presence of intestinal parasites. Our studies show that, on the average, pasture sheep carry seven times

as many nematodes as do range sheep. In fact, our investigators are of the opinion that it doesn't pay to feed medicated salt or mineral supplements to range sheep — especially since these drugs are no sure cure for the parasite on the range.

An unknown species of nematode has been recovered from sheep in the



Field camp in buck pasture of T U Ranch, Carbon County, for gathering insects to be fed to sheep to determine if insects are intermediate host of fringed tapeworm

Red Desert. It may be a new species, and we are trying to identify it.

Salt and mineral supplements containing phenothiazine seem to be worthwhile cures for farm flock troubled with stomach worm and with *Trichostrongylus* species.

### **New Sheep Disease Along Bear River**

Last year we reported discovery of a lungworm, *Dictyocaulus filaria*, in Converse and Sheridan Counties. Since then a species of the genus *Protostrongylus* has been recovered from sheep in the Bear River country. We are trying to identify it.

### **Fringed Tapeworm Stumps the Experts**

Here is a parasite with a life history that so far has stumped the experts.

It is of real concern to sheepmen because of the inroads it has made on the industry.

Insects collected from a pasture where there are heavy infestations were divided into groups and fed to sheep. One animal was fed ants and another received beetles. Both became infested with the worm. (There is always the possibility of the sheep becoming infested accidentally, and so these results shouldn't be regarded as conclusive.)

In cooperation with the State Veterinary Laboratory, our parasitologists found that diphenanthane-70 gave good results in getting rid of the parasite. Whether this sort of treatment is practical in the field, however, remains to be seen through further research.

## **INSECT PESTS**

### **Range Grasshoppers a Threat to Native Grass**

The losses suffered by ranchers and farmers from grasshoppers are staggering. Over a 10-year period those pests have chewed up close to one-half billion dollars worth of crop in the United States—and Wyoming has shared in that loss.

The year 1936, for instance, was one of particularly heavy damage from range grasshoppers. Losses in Wyoming amounted to \$1,480,000.

In that year there was no known method of control but since then, a very satisfactory bait has been developed that can be applied to the land

at the small cost of 40 cents per acre.

Cattle can't make the gains they should when they have strong competition for forage. A rancher may make plans to have his pasture grazed moderately; but if it also carries 15 grasshoppers per square yard, the grazing would be classified as heavy.

Our short-grass plains are an asset, valuable enough to nurture and protect. They are the basis for our livestock industry. Without the native grass, the industry would go under.

Range grasshoppers again are threatening to devour and destroy this natural crop, but we now have the methods and organization to pre-

went a general outbreak.

The life and work of an insect depend naturally on its environment and food supply. Research has to step in and examine the insect from every angle, before any reliable control methods can be set. That means study of population trends—seasonal history of the insect—food supply and breeding habits—and the effects of wide-scale baiting.

### **What's Best Killer for Hornflies?**

Hornflies are a problem wherever cattle are raised. We have made

control trials on herds at Laramie, Wheatland, Lusk, Torrington, and Cheyenne. At the end of the 1948 season our entomologists had these results with insecticides of different strengths:

Methoxychlor DDT, 1½ percent, ranged 28 to 41 days in effectiveness and averaged good control for 33 days.

DDT 1½ percent ranged 19 to 45 days with an average good control for 36 days.

DDT ½ percent averaged 21 days of fair control.

## **HONEY BEES**

### **What the Big Winter Did to Bees**

The severest winter in two generations had a telling effect on bee colonies that were wintered over. If they went into the fall season weak or only medium in strength, chances are they succumbed in the cold and the snows that descended at the turn of the year, and after.

This Experiment Station cooperates with the Intermountain States Bee Culture Laboratory of the U. S. Bureau of Entomology and Plant Quarantine, which has its offices on the University campus. The laboratory receives a considerable number of samples of brood and adult bees for disease diagnosis and arsenical analysis, from many states. It also maintains numerous experimental colonies in the neighborhood of

Laramie for study of diseases that beset the honeymaker, particularly in connection with American foul-brood and its control. And these colonies have a story to tell.

Long periods of cold weather— together with high winds—kept the clusters in many colonies from moving around to foodstores in the hive. Of 96 colonies going into the winter of 1948-49, 26 were lost—and there would have been heavier casualties if we hadn't dug them out of the snowdrifts from two to five times during the winter. The pictures will give you some idea of the difficulties encountered.

Even toward the end of March it was tough to get into some of the apiaries because of snowdrifts and mud. On March 22 our men were finally able to get into some of the

colonies to give them needed stores. Each colony also received a pollen-soybean flour cake. And that came just in time, because it snowed again on March 24. Six to 9 feet of snow, inside windbreak snow fences, over the colonies was not at all uncommon.

At the first complete inspection of colonies in spring our apiarists found several colonies with water-soaked combs. This meant that considerable snow had drifted under the covers into the more exposed hives. The bees in some of these appeared to have been wet, and such colonies averaged

weaker than colonies with dry combs. A few colonies under deep snow appeared to have smothered. So even if they were able to survive the bad weather, those blizzards took the starch out of many of the weaker colonies.

And if it isn't the weather or disease, it's the food factor. The summer of 1948 was so dry that in 1949, only some 30 percent as much biennial sweet clover came up from wintered-over crowns in the Laramie basin. Hence we can expect a much smaller honey crop in 1949.

---

## LEGENDS FOR ILLUSTRATIONS ON OPPOSITE PAGE

**TOP ROW, LEFT**—Colonies were located by pushing an iron rod into the drifts

**TOP ROW, RIGHT**—Behind a 4-foot lath snow fence at an apiary, individual pits were dug in front of each colony in the shallow drifts. The drifts here were once as high as the fence but some of the snow had melted. Another storm had just started when this picture was taken

**MIDDLE ROW, LEFT**—At one apiary about 17 miles west of Laramie, colonies inside an 8-foot slab windbreak fence were buried under drifts up to 9 feet deep

**MIDDLE ROW, RIGHT**—Some colonies arranged singly and in pairs in deep drifts were liberated by digging pits

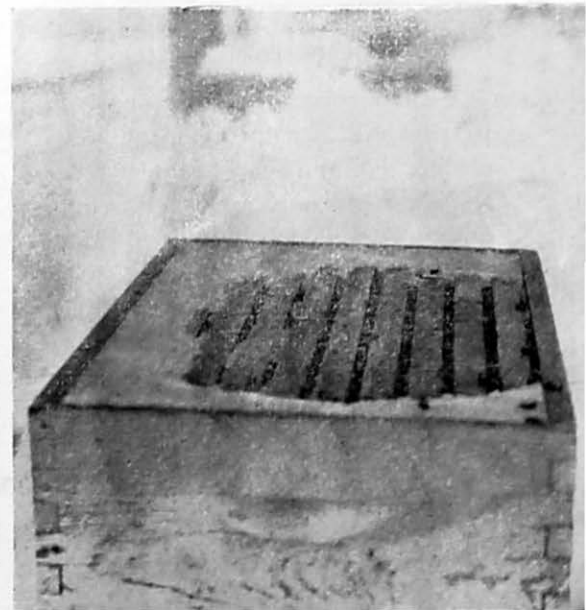
**BOTTOM ROW, LEFT**—Trenches were dug to liberate rows of colonies in deep drifts

**BOTTOM ROW, RIGHT**—Snow sifted under covers into many of the hives during the blizzards, killing some of the colonies and weakening others

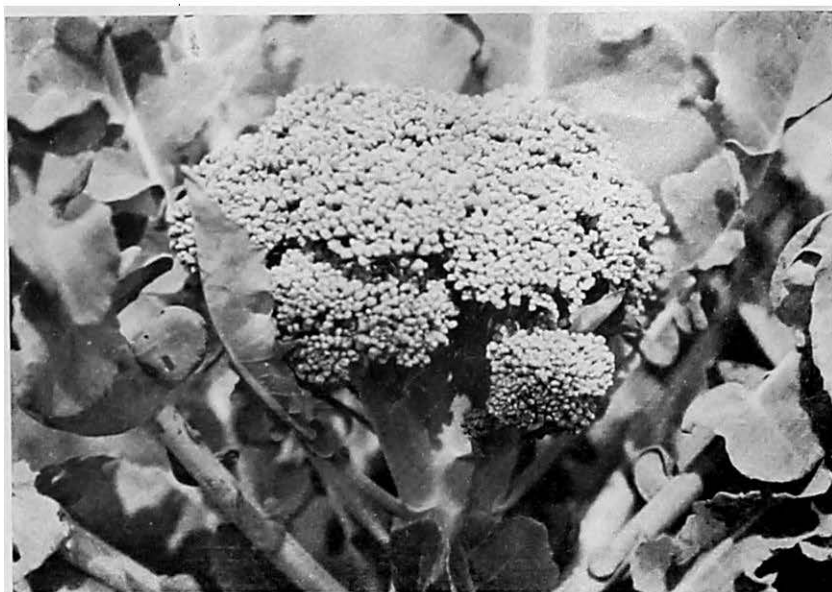


## "Operation Snowbound"

in Wyoming's  
Bee Colonies



## FOODS AND NUTRITION



Put this head of broccoli in a pan, cook it, add butter, serve—WHAT a dish! A good vegetable for high altitudes

### Advantages in Dehydrating Plus Freezing

Dehydration is a good method for preserving low-acid vegetables, since rate of spoiling is high when these are home-canned. Of course, not all vegetables responded alike to this method but it can mean considerable saving of locker space.

A combination of dehydration with freezing was used for peas, cauliflower, broccoli, and snap beans. Burpee Stringless green beans were good in quality when dehydrated to 55-56 percent moisture and then frozen. Cauliflower was treated to either 59, 65, 66, or 74 percent moisture before freezing. Since cauliflower begins at 92 percent moisture, this method re-

sults in considerable saving of locker space. When taken down to 49 percent moisture, cauliflower fared best, with discoloration very slight. Peas were fairly desirable when dehydro-frozen, according to tests so far. Broccoli was the least desirable of the vegetables so preserved.

### Blanching Calls for Ways to Restore Vitamin C

Our home economists are looking for ways to conserve all the vitamin C possible when they blanch vegetables for canning. For snap beans and tomatoes they found greatest losses from blanching in the open kettle. Then they tried different ways of cutting beans so as to put



Cauliflower must be tied up at the proper time to shield it from the sun, or it will turn brown and fail to form a solid head. And the leaves must be large and plentiful. This one grows on Ft. Collins loam at Laramie (7200 ft. elevation)

them in the shape in which the crop would eventually be eaten. The more cut surfaces the beans had, the greater the loss of vitamins. And when our workers shredded the pods lengthwise and blanched them, almost 71 percent of the vitamins were destroyed. Losses were cut to 44.4 percent when the beans were cut crosswise into one-inch pieces.

For both tomatoes and snap beans, more vitamin was conserved when the cut foods were packed raw, after which the products were exhausted and shrunk in the can. In such raw-packs, quality was high, but they were not as economical of can space as the pre-heated lots.

Canned peaches and pears showed almost no ascorbic acid. Enforcing them with this acid did three things:

it enhanced flavor and texture, prevented browning, and increased the vitamin C in the canned product. In peaches, 78 to 80 percent of the ascorbic acid added was retained and in pears, 58 to 59 percent. Pears were processed in the can 15 minutes longer than peaches to soften and preserve them.

Of course, length of processing was increased to account for the lower temperature at which water boils in this altitude of 7200 feet.

With these results our home economists hope to maintain a higher level of ascorbic acid where the supply of vitamin C depends so much on home-processed vegetables and fruits.

### Home Freezers for Green Vegetables

Home freezers are getting popular wherever ranches are being electrified. So it is important to have varieties of vegetables that will do well in deep freezers.

Experimental plots of peas, snap



Fava beans (Broad English variety) do well in the University's vegetable garden at Laramie





Long Island Improved is the name of this brussels sprouts, grown in the vegetable garden of the University of Wyoming at Laramie (elevation 7200 ft.)

content of ascorbic acid — in our home economics laboratory.

A class of students rated Navajo, Alderman, and Laxton Progress above a commercial brand of frozen peas. All varieties of broccoli outclassed the commercial brands.

Broccoli yields stayed high for three years. Snap beans weren't quite as sure as a high-altitude crop. Full-crop beans were more resistant to disease and yielded higher than eight other varieties. Seven varieties of cauliflower did not develop enough leaves to cover the heads completely. This resulted in split heads, green stalks, and bitter flavor. Danish Giant and St. Valentine cauliflower failed to mature before fall frosts. Frozen cauliflower became watery and was the least desirable of the vegetables frozen.

All vegetables tested for vitamin C were as high in values as those grown at low altitudes. But differences in vitamin C were seen among the varieties.

beans, broccoli, cauliflower, and spinach were grown at the Agronomy Farm at Laramie (7200 ft. elevation). These were evaluated for yield, time for maturity, freezing qualities, and

---

## Wyoming's Branch Experiment Stations

### THE AFTON FIELD STATION

*Superintendent:* RALPH J. HYER, B.S.

#### Will Cows Eat Meat?

Ten percent of meat scraps in the grain ration was eaten with apparent relish, but it showed no improvement in either butterfat or milk yield in the first year of test.

Twenty-seven cows rotated weekly

in three 7-acre pastures for 92 days gave an average butterfat yield of 1.209 pounds per head daily. Nine cows pastured constantly on one 7-acre pasture yielded on the average 1.206 pounds each per day. Those are one-year's results; we'll see what happens in another year.

### **Bluegrass and Clover Good, but—**

Different pasture mixtures were seeded at the rate of 21 pounds to the acre, grass being clipped every 21 days. After four years of trials we got these results (in pounds of air-dry grass per acre):

A mixture in varying amounts of smooth brome, orchard grass, alsike clover, and Dutch clover yielded 5,118 pounds.

Smooth brome, orchard grass, meadow fescue, alsike, and Dutch clover produced 4,661 pounds.

A third mixture contained smooth brome, orchard grass, alta fescue, perennial ryegrass, yellow sweet clover, and Dutch clover but yielded only 3,822 pounds to the acre.

In contrast, a check pasture composed of bluegrass and Dutch clover produced 4,585 pounds—not far under the second mixture mentioned.

### **Fertilizer plus 2-4,D for Barley**

Barley plots were replicated four times and treated with fertilizer. Our best results came from applications of

170 pounds of ammonium nitrate per acre in two applications, plus a treatment with 2-4,D. That gave us 3,160 pounds barley to the acre.

The next best results (2,720 pounds barley) resulted from using the same amount of nitrate but without 2-4,D. Where we used only the 2-4,D treatment we got our poorest yield—2,240 pounds. Even the check plot—no fertilizer, no 2-4,D—did better with 2,600 pounds barley. (Fertilizer in these trials was applied June 11 and July 9.)

### **Ammonium Nitrate for Pastures**

Pasture plots fertilized with ammonium nitrate at the rate of 170 pounds per acre yielded best results when only two applications were made—7,600 pounds air-dry grass per acre. A single application gave us 7,100 pounds, and three applications netted only 6,700 pounds, while a check plot yielded 7,400 pounds.

From 140 pounds of treble superphosphate, one application, the yield was 4,610 pounds per acre; from 210

Field Day at the Archer Station (Laramie County) drew large numbers of farmers and ranchers from Southeastern Wyoming and nearby states to view the experimental work in range grasses, pasture rotations, grain crops, and pasture pitting



pounds of the same in one application, plus 140 pounds ammonium nitrate, 6,000 pounds of grass resulted. But 85 pounds only of ammonium nitrate netted only 5,560 pounds—not very far from the check yield of 5,040 pounds grass.

### **Unnamed Selections Did Best In Spring Wheat Trials**

Best yields of spring wheat in 1948 came from two unnamed selections—41.6 bushels and 41.1 bushels per acre. Mida was third with 40.7 bushels.

Among oat varieties, Gopher was way ahead of competitors with a 97.0 bushel yield. Clinton produced 82.4 bushels.

Beecher did best of 16 barleys with a 66.3 bushel yield, followed by Gem, 61.6 bushels, and a bulk selection, 60.2 bushels per acre.

### **Poultry Mash With or Without Scratch?**

In an 11-month test of two lots of

White Leghorns and two of New Hampshires—124 birds in each—two rations were compared in each breed.

The Hampshires laid 1457.4 dozen eggs from a mash containing 25 percent protein, plus scratch grain. They did better—1789.3 dozens—when we dropped the scratch and fed only 17 percent protein mash.

With Leghorns the trend was a little different. They received the same rations as the Hampshires. With the scratch supplementing the 25 percent mash they produced 1537.3 dozen eggs, or 80 dozens more than the Hampshires. But on the 17 percent mash, without scratch, the Leghorns laid 1726.4 dozen eggs, or 63 dozens less than the Hampshires.

At the end of the experiment, death losses showed 11 birds dead among Hampshires on the 17 percent protein mash and 17 birds on the 25 percent mash. Leghorn losses were 11 and 22 birds respectively.

---

## THE ARCHER FIELD STATION

*Superintendent:* A. L. NELSON, M.S., Agronomist, U.S.D.A.

### **Crop Rotations at Archer**

Kanred winter wheat used in 12 different cropping combinations gave the highest yield, 27.5 bushels per acre, when it was seeded after peas turned under for green manure. Corn and oats followed in this 4-year rotation, the oats making 16.6 bushels per acre with the corn a failure.

In a 3-year rotation with Acme spring wheat following two years of corn, yield was 16.5 bushels per acre

when the corn ground was duck-footed as seedbed preparation. A 3-year rotation of spring wheat, fallow, and millet resulted in the lowest yield of Acme wheat—4.5 bushels per acre—when it was seeded on the duck-footed millet stubble.

Markton oats in 22 cropping combinations gave highest yield—31.3 bushels per acre—in a rotation of peas, wheat, corn, oats, when oats was seeded on duckfooted corn stubble.

Lowest yield was 3.8 bushels when oats was seeded on duckfooted corn stubble in a rotation of corn, oats, fallow, wheat.

White Smyrna barley in seven different combinations yielded 20.6 bushels in a rotation of three years of barley and one of fallow. This result was the first barley crop after fallow. The succeeding two crops produced at the rate of 3.3 and 12.1 bushels per acre.

### **Small Grains in a Dry Year**

In this dryland section our experience in 1948 with spring wheat varieties was very much like that of Afton: two unnamed selections did best with yields of 17.8 and 14.4 bushels per acre, with Mida in third place at 12.4 bushels. Sixteen varieties and

selections were tested.

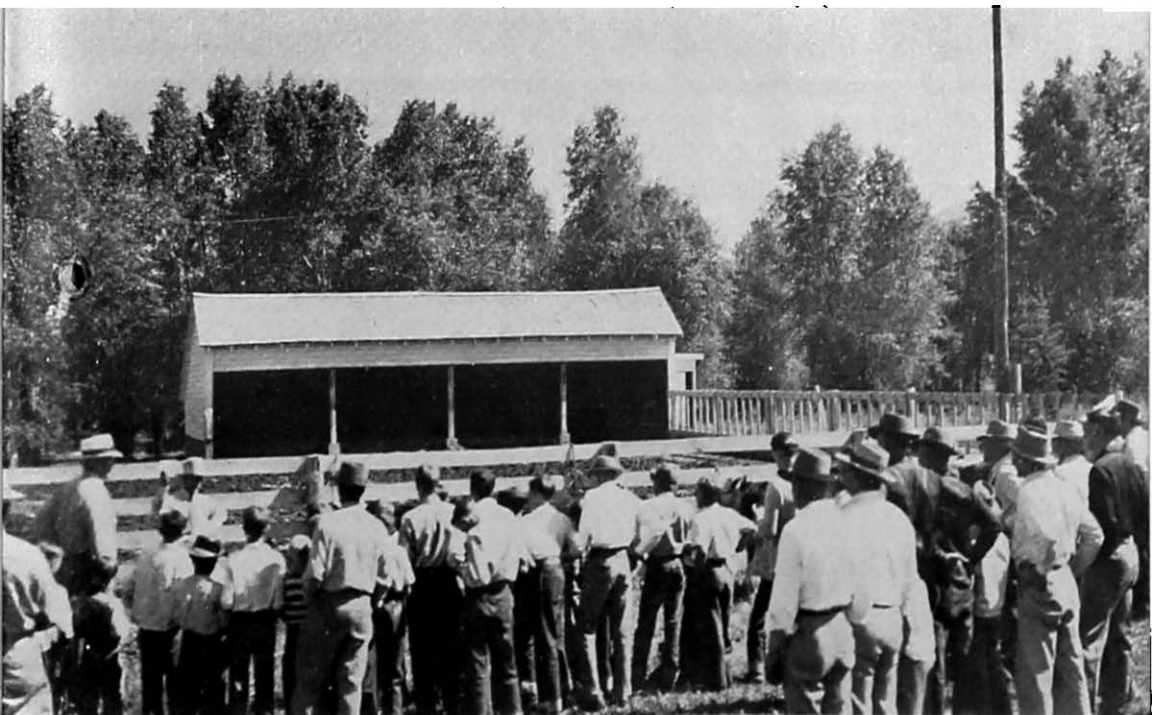
The following varieties made the best showing among 16 winter wheat trials. Minter produced 18.1 bushels followed closely by Nebred with 18.0 bushels per acre. Kharkof was third with 17.5 bushels.

In barley trials with 16 varieties, Trebi was first with 21.4 bushels per acre. Munsing came next with 19.6 bushels, and Velvon Compana third with 19.3 bushels.

### **Other Work at Archer**

A great deal of research in pasture grasses and in mechanical treatment of soil is carried on at the Archer Field Station. You will find a full report on pages 3 to 6 of this bulletin.

**At the Afton Station's Field Day in June, keen interest marked the judging of dairy cows**





Typical pitting on shortgrass range at the Archer Station

## THE GILLETTE FIELD STATION

*Superintendent:* LELAND R. LANDERS, M.S.

### **Cadet and Onas Do Well As Spring Wheats**

In spring wheat the three best yielders out of 16 selections at Gillette were Cadet with 34.4 bushels per acre, Onas (32.7 bu.), and an unnamed cross (31.9 bu.).

Winter wheat trials of 16 selections revealed Cheyenne in first place with 30.6 bushels per acre. Yogo was a close runner-up with 30.4 bushels. A Cheyenne cross was third with 29.2 bushels.

A selection proved best among 16 tests of oats. It produced 68.6 bushels. Gopher (65.5 bu.) and Osago (65.2 bu.) followed closely.

Among 16 Barley varieties, Mun-  
sing and a bulk selection tied for first place with 35.4 bushels. Frontier followed with 34.8 bushels.

### **Crested Wheatgrass for Early Pasture**

Hereford cattle were grazed for 152 days on a pasture composed entirely of native grasses. They made gains of 24.4 pounds per acre. We got better results from grazing on two other pastures for the same number of days. These consisted of a crested wheatgrass pasture grazed during the first 45 days, and native grass, four-fifths of the total, for the remaining time. There the gains were 28.6 pounds to the acre—not a bad increase over pure native-grass pasture.

### **Barley Responds to Nitrate**

Different amounts of ammonium nitrate were tried on barley plots in 1948. Best results followed 200 pounds applied April 16 and June 2 with 41.5 bushels per acre. But we

had almost as good production (39.7 bushels) when we applied only 100 pounds on those two dates.

### **Pasture Fertilizing in a Dry Year**

Pasture plots of crested wheatgrass measuring 1/40th acre, replicated three times, were treated with ammonium nitrate in different amounts in 1948. It was a dry year but even so, we got notable results from 100

pounds per acre of the fertilizer — a 76 percent increase in air-dry hay, compared with the check plots, which received no treatment. Results were the same when 160 pounds of the nitrate was applied instead of 100 pounds.

Similar results followed treatment with treble superphosphate on 1/20th-acre plots. Application of 200 pounds in 1947 gave us in 1948 a 60 percent better yield than the untreated check.

---

## THE POWELL FIELD STATION

*Superintendent:* DALE B. FRITZ, B.S.

Powell is the newcomer among our experimental branch stations. It was established in 1947. Crops under investigation there include beans, small grains, potatoes, and alfalfa. In another part of this bulletin (page 13) you will find a complete report on work done with bean diseases at this

station.

This field station lies in a fertile valley (Shoshone River) where irrigated agriculture has been developed in the past two generations. The research being undertaken here should prove of much value to the farmers in that region.

---

## THE TORRINGTON FIELD STATION

*Superintendent:* LEON H. PAULES, B.S.

Varietal tests, disease and insect-control methods, and fertilizer tests make up the research at this outpost of the University of Wyoming.

The Torrington Station is irrigated.

### **New Wheat Crosses Best Yielders**

Sixteen varieties and selections figured in the spring-wheat trials. Crosses of varieties were the best three producers with yields of 44.5,

44.1, and 42.9 bushels to the acre.

It was the same story, more or less, in oat trials of 1948. Crosses were among the leaders with 89.0 and 85.3 bushels. Victory was in between with 88.0 bushels per acre.

And in barley it was much the same. A cross was in first place at 49.1 bushels yield per acre. Another cross tied with Trebi with 45.9 bushels each.

## Barley Goes for Ammonium Nitrate

Ammonium nitrate, 230 pounds per acre, gave us the highest yield of barley at 78.0 bushels, but 100 pounds of the same produced 73.3 bushels. Ammonium phosphate did fairly at 135 pounds, yielding 67.2 bushels. But treble superphosphate, 125 or 250 pounds, gave us the lowest yields at around 49 bushels.

## Pellet Lunch for Pullets?

Four pens of White Leghorns were treated differently for 11 months—some were debeaked, some received pellets at noon. From the table below it seems plain that debeaking is a help, but pellets are not.

	Pen 1	Pen 2	Pen 3	Pen 4
Hens debeaked	Yes	No	Yes	No
Hens at start	127	127	125	125
Hens at close	119	110	119	109
Noon lunch, pellets	Yes	Yes	No	No
Eggs per pen, dozen	1823	1861	2097	1931
Feed cost per dozen eggs	\$0.30	\$0.292	\$0.263	\$0.283

## Ammonium Phosphate for Sugar Beets

Ammonium phosphate — 500 pounds of it—was the fertilizer producing the highest yield of sugar beets in 1948—averaging 23.70 tons

with a sugar content of 3.98 tons per acre. That was the result out of 12 different combinations of fertilizers. Ammonium nitrate—125 pounds at seeding time and 125 pounds at thinning—gave us 22.20 tons yielding 3.83 tons of sugar. Twelve tons of manure produced 21.90 tons of beets with 3.71 tons of sugar. The check plots, which received no treatment, yielded 17.97 tons of beets or 3.11 tons of sugar.

## Best Sheep Gains From Three Feedings Per Day

We started a 93-day feeding experiment with 102 sheep in each of five lots. The tests began November 16, 1948, and closed February 17, 1949, with only four of all the sheep dead.

The basic ration, fed twice daily, consisted of barley, alfalfa, and wet beet pulp. The following table gives you the average weights and gains of the lots as well as the cost of feed for each lot.

Lot 2 had no beet pulp. Lot 3 received a grain mixture of 1 part cull beans and 4 parts whole barley. Lot 4 received the basic ration three times daily. Lot 5 was deticked at start of the trials.

**Weights and Gains in Pounds**  
(weights equal 3-day averages less 3% shrink)

	Lot 1	Lot 2*	Lot 3	Lot 4	Lot 5
Average initial weight per head	65.07	66.70	65.30	64.41	64.10
Average final weight per head	88.63	90.79	88.68	90.40	87.71
Average daily gain per head	.25	.26	.25	.28	.25
Cost of feed per 100 pounds gain (based on local prices)	\$14.50	\$15.90	\$13.94	\$13.42	\$15.09

\*Lot 2 received no beet pulp.

### Higher Returns From Higher Grain Ration

Starting December 10, 1948, and winding up 161 days later on May 20, 1949, we put 30 steers through a feeding trial to determine the effect of low, medium, and high-grain levels in the ration. We divided these into three lots of 10 each. The ration was composed of ground barley, alfalfa, beet pulp, and corn silage. Let's look at the table showing weights, gains, feed costs, and selling prices for each lot.

**Weights and Gains in Pounds**  
(weights equal 3-day averages less 3% shrink)

	<i>Lot 1</i> <i>(low grain level)</i>	<i>Lot 2</i> <i>(medium)</i>	<i>Lot 3</i> <i>(high grain level)</i>
Average initial weight per head .....	768.66	765.66	762.00
Average final weight per head .....	1048.66	1083.66	1073.66
Average daily gain per head .....	1.69	1.92	1.88
<i>Cost of feed per 100 pounds gain (based on local prices)</i>	\$21.27	\$21.34	\$21.29
<i>Selling price per hundred pounds</i>	\$25.50	\$25.90	\$26.25

### Trees via Clarke-McNary

Some 148,000 trees—good for wind-break and shelterbelt plantings—were distributed in 1949 among farmers and ranchers. This is the largest number planted in 22 years and represents 394 orders in 21 counties as against 459 orders a year ago—but only 136,000 trees were distributed in the program in 1948. So the average number of trees per order was much greater in 1949 than in the year before.

Laramie County ranked first with 27,000 trees in 66 orders, followed by Platte with 62 requests. Most popular were the Chinese elm, of which 30,000 specimens were distributed, followed by Caragana, in second place

### Good Alfalfa for Goshen

Seven alfalfa varieties are being tested for hay yield. The test includes the new varieties Atlantic, Ranger, and Buffalo as well as the older ones Meeker Baltic, Grimm, Cossack, and Ladak.

Results so far show that Meeker Baltic, Atlantic, and Ranger are the highest yielders. Ladak and Buffalo are the poorest varieties under the climatic conditions at Torrington.

with 29,000; Ponderosa pine, third with 20,000; and Russian olive, fourth with 19,000. Other species distributed were cottonwood, American elm, green ash, red cedar, native plum, and box elder (Manitoba maple).

These trees were distributed by the Department of Agricultural Substations of the Agricultural Experiment Station under the federal Clarke-McNary Act and came from the Torrington Field Station. Much credit is due the Agricultural Extension Service in the counties through the efforts of county agents in encouraging ranchers and farmers to plant the trees for much-needed protection of buildings, gardens, lawns, and livestock.



## WEATHER REPORT FOR 1948

### *1. For the Experiment Station at Laramie.*

The mean temperature for the year, 41.7° F., (the sum of the daily maximum and minimum temperatures divided by two) was 0.3° above the 57-year normal of 41.4°. January, February, March, and November were below normal while October and December had about average temperatures. April, May, June, July, August, and September had above-normal temperatures. The highest temperature for the year was 87° on July 11 and 13 and on August 16, 17, 29, and 30. The lowest temperature was -25° on January 28. There were 70 days when the maximum temperature was 32° or below. The mean daily range in temperature was 25°. The greatest daily range in temperature was 46° and the smallest range on any one day was 7°. The last spring minimum of 28° or below was on May 13 with a minimum of 28°. The first fall minimum of 28° or below was on October 6 with a minimum of 22°. The number of days between minimums of 28° or below was 146 days.

The precipitation of 9.35 inches was 2 inches below the 66-year aver-

age of 11.35 inches. The lowest precipitation recorded at Laramie was 3.84 inches in 1893. The highest was 17.77 in 1872. March, April, and May, 1948, were below normal so that there was very little growth of grass on the range.

Other data are shown in the accompanying tables.

### *11. For the State (From Climatological Data, Wyoming, Annual Summary, U. S. Department of Commerce, Weather Bureau)*

Mean temperature—42.3°.

Normal—42.0°.

Average precipitation—12.86 in.

Normal—14.55 in.

Mean maximum temperature — 57.1°.

Mean minimum temperature — 28.1°.

Highest temperature—105° at Red Bird.

Lowest temperature — -48° at Bondurant.

Greatest annual precipitation — 39.23 in. at Snake River.

Least annual precipitation — 4.88 in. at Basin.

Other data are shown in the accompanying tables.

## Meteorological Summary, 1948, by Months

	PRECIPITATION				No. of Days						
	Total Amount	Greatest in 24 hrs.		Snowfall	*Mean Dewpoint	*Mean Relative Humidity	*Mean Vapor Pressure	Clear	Partly Cloudy	Cloudy	With .01 inch or more precipitation
		Amount	Date								
January .....	.57	.25	18	12.0	13.3	83.3	.091	18	5	8	7
February .....	.89	.42	23	12.3	14.4	80.2	.094	20	3	6	7
March .....	.17	.07	20	3.5	15.5	79.5	.107	13	12	6	5
April .....	.63	.54	24	2.5	23.7	51.4	.124	7	11	12	6
May .....	.89	.58	28	0.4	30.9	51.1	.184	7	16	8	6
June .....	2.02	.69	3	0	40.6	54.0	.258	10	15	5	9
July .....	.98	.34	28	0	42.3	47.2	.258	18	11	2	9
August .....	.51	.22	25	0	41.3	50.1	.265	10	19	2	6
September .....	1.05	.54	30	0	34.3	48.9	.198	16	10	4	5
October .....	.19	.15	5	0.2	23.8	53.7	.130	23	5	3	3
November .....	.52	.15	3	5.8	15.7	72.7	.092	10	11	9	9
December .....	.93	.40	22	9.0	12.3	68.8	.077	13	8	10	9
Year.....	9.35	.69	June 3	45.6	25.7	61.7	.149	165	126	75	81

\*Mean (Average 7 a.m.—Average 7 p.m.)—2

## Meteorological Summary, 1948, by Months—(Continued)

### TEMPERATURE

	Mean							Range			Number of days with			
	° Maximum	° Minimum	° Monthly	° Highest	Date	° Lowest	Date	° Absolute	° Mean Daily	° Greatest Daily	Max.		Min.	
											32° or below	90° or above	32° or below	Zero or below
January .....	29.7	8.7	19.2	52	7	-25	28	77	21	46	19	0	28	10
February .....	32.3	10.2	21.2	50	26	-15	8	65	22	44	14	0	28	6
March .....	35.5	15.6	25.6	56	23	-11	11	67	20	33	10	0	29	4
April .....	55.3	28.3	41.8	72	29	19	12	53	27	42	0	0	21	0
May .....	65.9	36.2	51.0	80	17*	20	3	60	30	46	0	0	12	0
June .....	72.6	46.0	59.3	84	6*	40	21*	44	27	37	0	0	0	0
July .....	80.3	49.5	64.9	87	11*	43	15	44	31	37	0	0	0	0
August .....	79.6	51.4	65.5	87	16*	46	15	41	28	38	0	0	0	0
September .....	72.3	44.3	58.3	84	4*	30	8	54	28	42	0	0	1	0
October .....	58.3	29.0	43.6	71	3	10	17	61	29	42	0	0	23	0
November .....	36.3	17.2	26.8	55	1	0	28	51	19	40	12	0	28	1
December .....	33.2	13.7	23.5	55	3	-5	25	60	20	43	15	0	30	4
Year .....	54.2	27.5	41.7	87	11 July 16 Aug*	-25	Jan 28	112	25	46	70	0	200	25

\* and other dates.

### Meteorological Summary, 1948, by Months—(Concluded)

	AIR PRESSURE (Barometer)					WIND				Maximum Velocity		
	Mean	Highest Observed	Date	Lowest Observed	Date	Total Movement	Average Hourly Velocity	Prevailing Direction	No. of days with Max. Vel. of 40 mph or over	Miles	From	Date
January .....	23.02	23.27	5	22.61	23	6871	9.2	SW	0	31	W	11
February .....	22.92	23.23	17	22.48	22	5974	8.6	SW	0	29	SW	27
March .....	22.86	23.23	23	22.55	30	7460	10.0	SW	0	38	SW	30
April .....	23.00	23.39	2	22.67	23	7536	9.2	SW	0	27	SW	7
May .....	23.05	23.26	16	22.60	8	6195	8.3	SE	0	20	SE	4, 8, 25
June .....	23.11	23.32	29	22.80	21	5146	7.1	SE	0	21	SE	19
July .....	23.16	23.29	31	23.01	27	5603	7.5	SE	0	24	SW	29
August .....	23.20	23.37	29	23.06	8	5769	7.8	SE	0	21	SW	24
September .....	23.17	23.34	14	22.88	23	5315	7.4	SE	0	26	SE	25
October .....	23.14	23.41	22	22.75	5	5276	7.1	SE	0	24	NW	6
November .....	22.97	23.39	27	22.68	3	7741	10.7	SW	0	26	NW	4
December .....	22.89	23.46	30	22.78	4	8871	11.9	SW	1	50	W	20
Year.....	23.05	23.46	Dec. 30	22.48	Feb. 22	77757	8.7	SE	1	50	W	Dec. 20

## Representative Temperatures and Precipitation for 1948 in Wyoming

	Highest Temperature	Lowest Temperature	Mean Temperature	Normal* Temperature	No. of days between dates of 28° temp.	Precipitation 1948	Precipitation Normal*
Buffalo 5W .....	97	-23	43.7	.....	144	16.94	.....
Casper .....	99	-26	46.1	.....	154	11.54	.....
Cheyenne AP .....	91	-20	44.6	.....	153	11.91	15.02
Cody .....	94	-22	44.4	45.2	153	9.66	9.42
Dixon .....	90	-36	40.6	.....	148	11.72	12.90
Douglas .....	94	-25	45.4	45.2	154	12.54	13.89
Dubois .....	87	-31	38.8	40.0	107	8.5	9.33
Evanston .....	89	-26	37.6	39.7	107	13.55	13.99
Gillette .....	103	-17	44.9	45.2	149	18.12	14.78
Jackson .....	90	-29	37.2	37.6	89	15.63	16.89
Kemmerer .....	88	-29	38.2	40.2	.....	9.29	9.12
Lander AP .....	94	-20	43.6	42.5	118	10.9	12.67
Laramie .....	87	-25	41.7	41.3	146	9.35	11.23
Lovell .....	97	-28	43.9	44.2	144	7.83	6.92
Lusk .....	99	-14	45.1	44.3	149	14.74	14.48
Newcastle .....	97	-16	46.5	46.3	150	10.7	15.50
Pinedale .....	90	-31	36.1	35.4	89	10.95	11.04
Powell .....	97	-21	44.6	44.3	156	4.93	5.91
Rawlins .....	91	-28	41.2	43.2	148	.....	.....
Riverton .....	98	-33	43.6	42.8	144	6.19	9.81
Rock Springs .....	94	-20	43.5	43.4	149	5.62	8.9
Sheridan AP .....	101	-26	45.4	43.4	155	20.13	15.08
Thermopolis .....	98	-34	45.2	45.4	150	14.04	12.72
Torrington Exp. Farm .....	97	-26	47.6	47.5	.....	13.46	14.32
Wheatland 1N .....	101	-25	48.7	48.7	169	14.03	13.65
Worland .....	100	-29	43.1	44.1	156	8.37	8.2

\* Normal—Average of record.

5W—5 miles west.

AP—Airport.

1N—1 mile north.

## CHANGES IN PERSONNEL

During the past fiscal year the following appointments have been made: Antoinette Clohessy, service chemist; George T. Davis, associate poultry husbandman; Gerald Jenny, editor; W. McNab Miller, assistant agricultural engineer; Jay N. Myers, assistant in wool; Clarence M. Rincker, assistant in agronomy.

Promotions include the following: Donald E. Jewell, assistant agricultural engineer; Neal W. Hilston, animal husbandman and head, Department of Animal Production; John A. Hopkin, assistant agricultural economist; E. Dean Vaughan, assistant agricultural economist; Alexander Johnston, wool specialist.

These persons have resigned during the year: Fred Frosheiser, assistant agronomist; Maurice R. Haag, editor; Frederic S. Hultz, animal husbandman; Donald Johnston, assistant in wool; Aubrey M. Lee, animal pathologist.

Leaves of absence were granted to Robert H. Burns, wool specialist; Irene Rosenfeld, associate pharmacologist; Harold S. Willard, dairy husbandman.

## PUBLICATIONS

### THE WYOMING AGRICULTURAL EXPERIMENT STATION

July 1, 1948-June 30, 1949

#### NUMBERED BULLETINS

- 286 Effect of Holstein Birthweight on Calf Gain and Final Weight, by H. S. Willard, August 1948.
- 287 The Inheritance of Tuber-set in *Solanum tuberosum L.*, by W. A. Riedl, December 1948.
- 288 High Altitude Vegetable Cookery, by Emma J. Thiessen, February 1949.
- 289 The Range Lands of Wyoming, by Aven Nelson, A. F. Vass, A. A. Beetle, and Robert Lang, February 1949.
- 290 Food Plants as Factors in the Ecology of the Lesser Migratory Grasshopper, *Melanoplus mexicanus* (Sauss.), by R. E. Pfadt, May 1949.
- 291 Using 2,4-D in Wyoming, by Dale Bohmont, May 1949.

#### ANNUAL REPORTS

58th Annual Report of the Wyoming Agricultural Experiment Station.

#### NUMBERED CIRCULARS

- 34 How to Use 2,4-D, by Dale W. Bohmont, July 1948.
- 35 Forage Plants for Wyoming Range, by Alan A. Beetle and Robert L. Lang, Dec. 1948.

#### MISCELLANEOUS PUBLICATIONS

- Field Day Report—Covey, Bagley, and Dayton (Cokeville, Wyo.), by R. H. Burns.
- Suggestions to Wyoming Farmers on Making Federal Income Tax Returns. Mimeographed report by J. A. Hopkin. [1949.]
- Results of Hybrid Corn Adaptation Trials for 1948. Mimeographed report by W. A. Riedl. [1949.]

#### BOOKS AND BOOK REVIEWS

*The Western Horse*, by J. A. Gorman, revised and reprinted January 1949.

Review of A. W. Griswold's *Farming and Democracy*, by A. F. Vass, *Annals Amer. Acad. Polit. and Soc. Sci.* vol. 259: 188-189. Sept. 1948.

#### JOURNAL ARTICLES

Food-Plants, Distribution, and Abundance of the Big-Headed Grasshopper *Aulocara elliotti* (Thos.). Robert E. Pfadt. *Jour. Kansas Entom. Soc.* vol. 22, no. 2: 69-74. Apr. 1949.

Listerellosis—Report of an Outbreak in Wyoming Sheep and Preliminary Experimental Therapy in Rabbits. A. M. Lee and J. F. Ryff. *Amer. Jour. Vet. Res.* vol. 9, no. 31: 147-151. Apr. 1948.

Studies of Vibrionic Abortion in Sheep. R. W. Lindenstruth, J. B. Ashcraft, and B. Q. Ward. *Jour. Amer. Vet. Med. Asso.* vol. 104, no. 865: 204-205. Apr. 1949.

The Genus *Scirpus* in Wyoming. Alan A. Beetle. *U. W. Pubs. in Sci.* vol. 13, no. 2: 1-15. Aug. 15, 1948.

The Genus *Aegopogon* Humb. and Bonpl. Alan A. Beetle. *U. W. Pubs. in Sci.* vol. 13, no. 2: 17-23. Aug. 15, 1948.

Use of Herbicides in the Control of Perennial Herbaceous Weeds (p.1); Effect of 2,4-D as a Selective Herbicide in Growing Crops (wheat and barley) (pp. 20 and 24). Dale Bohmont. Proc. 5th An. No. Centr. Weed Control Conf. Dec. 1948.

Weed Control in Wyoming. Dale Bohmont. Proc. 11th An. West. Weed Control Conf.: 19. Febr. 1949.

Planning for the 1950 Foal. J. A. Gorman. *Horse Lover Mag.*: 3, Feb.-Mar. 1949.

Aphid Control with Hexaethyl Tetraphosphate. Donald G. Denning. *Jour. Econ. Entom.* vol. 41, no. 5: 817. Oct. 1948.

Standardizing Hay Palatability Trials with Calves. H. S. Willard. *Jour. Dairy Sci.* vol. 32, no. 1: 10-16. Jan. 1949.

# FINANCIAL REPORT

## University of Wyoming Agricultural Experiment Station July 1, 1948, to June 30, 1949

### FEDERAL FUNDS

#### Receipts

From the Treasury of the United States, as per appropriations for the fiscal year ending June 30, 1949, under Acts of Congress approved March 2, 1887 (Hatch fund), March 16, 1906 (Adams fund), February 24, 1925 (Purnell fund), June 29, 1935 (Bankhead-Jones fund), and August 14, 1946 (Research and Marketing fund, Section 9b1 and 9b2).

Hatch fund .....	\$15,000.00
Adams fund .....	15,000.00
Purnell fund .....	60,000.00
Bankhead-Jones fund .....	7,829.36
Research and Marketing fund* .....	16,945.06†

\*An additional sum of \$8,500 (plus \$2,849.74 carry-over) was received under Section 9b3, Title 1, of the Research and Marketing Act. Of the appropriation, \$8,068.83 was expended during the current year. This is a special fund, earmarked for certain research projects carried on in cooperation with other state experiment stations outside of Wyoming.

† Plus carry-over of \$10,412.55.

#### Expenditures

	Hatch Fund	Adams Fund	Purnell Fund	Bankhead- Jones Fund	Research and Marketing Fund
Personal Services .....	\$12,683.57	\$13,166.69	\$56,235.32	\$6,920.00	\$11,264.21
Travel .....	300.00	480.35	2,179.99	343.89	1,009.38
Transportation of things .....			7.22		32.58
Printing and binding (of publications) .....	1,947.93		400.00		
Other printing and binding .....	68.50				
Other contractual services .....					478.20
Supplies and materials .....		661.26	710.26		
Other supplies and materials .....		186.52		286.06	460.43
Equipment .....		505.18	467.21	279.41	4,712.10
Total expended .....	\$15,000.00	\$15,000.00	\$60,000.00	\$7,829.36	\$17,956.90

### NON-FEDERAL FUNDS

#### Funds available for agricultural investigations

State appropriations or allotments	
Main station .....	\$128,870.98
Substations .....	81,016.95
Special endowments, fellowships, and grants .....	281.80
Sales .....	111,329.10
Balance brought forward from previous year .....	54,655.10*
Total .....	\$376,153.93

\*Balance brought forward from previous year reduced by \$1,520 for receipts credited under Special Grants in error during fiscal year ending June 30, 1948.

#### Classification of expenditures for agricultural investigations

Personal services .....	\$128,105.39
Travel .....	9,922.46
Communication service—Transportation of things .....	4,483.40
Rents and utility services .....	7,081.55
Printing and binding .....	2,421.69
Other contractual services .....	9,525.32
Supplies and materials .....	70,359.89
Equipment .....	51,297.72
Lands and structures .....	20,884.55
Total .....	\$304,081.97
Unexpended balance .....	72,071.96
Grand total .....	\$376,153.93



# UNIVERSITY OF WYOMING Agricultural Experiment Station

## BOARD OF TRUSTEES

### Officers

Milward L. Simpson..... President      John A. Reed..... Treasurer  
Tracy S. McCracken..... Vice President      Fay E. Smith..... Comptroller and Secretary

### Appointed

### Members

### Term Expires

1939.....	MILWARD L. SIMPSON—Cody.....	1951
1947.....	H. D. DelMONTE—Lander.....	1953
1947.....	MRS. LORNA PATERSON—Shell.....	1953
1943.....	EARLE G. BURWELL—Casper.....	1953
1943.....	TRACY S. McCRACKEN—Cheyenne.....	1955
1946.....	CLIFFORD P. HANSEN—Jackson.....	1955
1945.....	JOSEPH R. SULLIVAN—Laramie.....	1951
1945.....	H. D. WATENPAUGH—Sheridan.....	1951
1949.....	JOHN A. REED—Kemmerer.....	1955
	A. G. CRANE, Governor of Wyoming.....	Ex Officio
	EDNA B. STOLT, State Superintendent of Public Instruction.....	Ex Officio
	GEORGE DUKE HUMPHREY, Ph. D., President of the University.....	Ex Officio

### STATION STAFF\*

#### Administration

J. A. HILL, B.S., LL.D., Dean of College of Agriculture; Director of Station.  
HAROLD W. BENN, M.S., Administrative Assistant to Dean and Director.  
W. L. QUAYLE, B.S., Director Experiment Farms.  
GERALD JENNY, M.S., Station Editor.  
JOSEPHINE McCUE, B.A., Station Clerk.

#### Agronomy and Agricultural Economics

A. F. VASS, Ph.D., Agronomist.  
G. H. STARR, Ph.D., Agronomist; Plant Pathologist.  
T. J. DUNNEWALD, M.S., Assoc., Soil Investigations.  
W. A. RIEDL, Ph.D., Agronomist.  
ROBERT LANG, M.S., Assoc. Agronomist.  
ALAN A. BEETLE, Ph.D., Assoc. Agronomist.  
JOHN A. HOPKIN, B.S., Asst. Agricultural Economist.  
E. DEAN VAUGHAN, M.S., Asst. Agricultural Economist.  
GEORGE BRIDGMON, M.S., Asst. Plant Pathologist (on leave).  
D. E. JEWELL, B.S., Asst. Agricultural Engineer.  
IRA M. STEVENS, B.S., Asst. Agricultural Economist.  
DALE BOHMONT, B.S., Asst. Agronomist.  
JO. K. BARNES, B.S., Assoc. Agronomist.  
CLARENCE M. RINCKER, M.S., Asst. in Agronomy.  
W. McN. MILLER, M.S., Asst. Agricultural Engineer.  
†BYRON TOMLINSON, B.S., Asst. Irrigation Engineer.

#### Animal Production

NEAL HILSTON, Ph.D., Animal Husbandman, Beef Cattle.  
H. S. WILLARD, Ph.D., Animal Husbandman, Dairy Cattle.  
J. A. GORMAN, M.S., Asst. Animal Husbandman, Horses.  
E. KENNETH FAULKNER, M.S., Asst. Animal Husbandman, Beef Cattle.  
DONALD C. BROWN, B.S., Asst. Animal Husbandman, Poultry, Dairy Cattle.  
GEORGE T. DAVIS, M.S., Assoc. Animal Husbandman, Poultry.

#### Apiculture and Entomology

ROBERT E. PFADT, Ph.D., Assoc. Research Entomologist.  
DONALD G. DENNING, Ph.D., Asst. Research Entomologist.

†A. P. STURTEVANT, Ph.D., Senior Apiculturist in Charge of U.S. Bee Culture Field Laboratory.  
†C. E. BURNSIDE, Ph.D., Apiculturist.  
†L. L. REVELL, A.B., Junior Apiculturist.  
†J. D. HITCHCOCK, M.A., Junior Apiculturist.

#### Chemistry

O. A. BEATH, M.A., Research Chemist.  
CARL S. GILBERT, M.A., Research Chemist.  
H. F. EPPSON, M.S., Assoc. Research Chemist.  
IRENE ROSENFELD, Ph.D., Assoc. Pharmacologist (on leave).  
JOHN W. HAMILTON, Ph.D., Asst. Research Chemist.  
ANTOINETTE CLOHESSY, M.S., Service Chemist.

#### Home Economics

ELIZABETH J. McKITTRICK, M.S., Home Economist.  
EMMA J. THIESSEN, M.A., Assoc. Home Economist.

#### Library

MARY E. MARKS, Ph.B., Librarian.

#### Veterinary Science and Bacteriology

R. W. LINDENSTRUTH, D.V.M., Asst. Veterinarian.  
J. B. ASHCRAFT, D.V.M., Asst. Veterinarian.

#### Weather

H. F. EPPSON, M.S., Head of Weather Station.  
FRANK E. HEPNER, M.S., Weather Station (limited service).

#### Wool

J. A. HILL, B.S., LL.D., Wool Specialist.  
ROBERT H. BURNS, Ph.D., Wool Specialist (on leave).  
ALEXANDER JOHNSTON, M.S., Wool Specialist.  
LAWRENCE C. PARKER, M.S., Research Asst.  
JAY N. MYERS, M.S., Asst. in Wool.

#### Zoology

JOHN W. SCOTT, Ph.D., Zoologist and Parasitologist (limited service).  
RALPH HONESS, M.A., Asst. Research Zoologist.

\*As of June 30, 1949.

†In cooperation with U. S. Department of Agriculture.

