With an average yield of 26.24 tons per acre on 30.11 acres, John (left) and Henry Stroh, Wildcat station, Longmont district, had the honor in 1938 of producing the highest tonnage per acre among more than 10,000 sugar beet growers served by The Great Western Sugar Company in Colorado, Nebraska, Wyoming and Montana.

JANUARY, 1939

THE GREAT WESTERN SUGAR CO.
Harvests 14-Ton Crop from Field "Ruined" by Hail!

JACOB LEBSACK, Jr., of Proctor, Colorado, in the Sterling factory district, was one of the many growers whose crops were "hailed out" as shown by the above picture taken of his field on June 10, 1938, one hour after the storm. Instead of "selling out for fifty cents" as he expressed it, he cared for this field to the best of his ability with the result that he harvested 14.72 tons per acre with a 17.1 per cent sugar content. No other crop compares with beets for recovery after hail.
Water Outlook Favors High Beet Yields

MORE than a million acre feet of water now in storage!

That's the good news the New Year has brought to Colorado-Nebraska-Wheatland beet growers.

On January 1, 1939, Colorado reservoirs serving the beet areas had more than 2 1/2 times as much water, and Nebraska had more than 2 1/3 times as much as on January 1, 1938.

Colorado reservoirs were filled to 2-3 capacity, with more than 480,000 acre feet as compared with about 183,000 a year ago.

Nebraska's combined storage in the Pathfinder, Alcova, Guernsey and Minatare reservoirs was approximately 504,000 against 212,000 the previous year.

WATER means tonnage over the dump to the beet farmer!

Water is the biggest part of the beet. At harvest time the beet roots in the field may be 75 to 80 per cent water. The top foliage may be 90 per cent. The plant as a whole—root and leaves—may be 85 per cent water.

Moreover, the areas which were hit hardest by the drouth years seem to be building up an excellent supply. Fort Collins has about four times as much water in storage as a year ago; Loveland six times as much; Longmont three times as much; Brighton five times as much.

Reassuring also is the soil moisture situation. Early January snows over much of the territory have created an excellent situation, also piling up additional supplies in the mountains back of the reservoirs. Prior to these snows, the mountain supply was already 37 per cent more plentiful as reported by 12 high-altitude Colorado stations than a year ago.

THIS excellent water outlook challenges the beet farmer to make the most of his opportunities.

The beet plant may be 85 per cent water, but water alone won't do the trick unless sound farm management enables the beet to make fullest use of water.

One of the first considerations is the connection between water and fertility. Plants require fertility to make growth. And plants
can "eat" only liquid food. So it's important to convert fertility into "soup" as early as possible. Get the manure out early—if it was not hauled out last fall. Moisture will help decompose it, making plant foods available through the complex processes of organic and chemical changes which take time and cannot be hurried at the last minute.

Be ready to use phosphate if you have reason to believe that your soil will benefit by it.

And as soon as you can get into the fields, remember that your stand is in the making! Skips and gaps in the stand cannot be corrected under general farming conditions after the crop is under way. They must be prevented as far as possible by preparing a fertile, garden-like seed-bed, packed all the way down—followed by careful planting at the earliest favorable opportunity.

THE high yields of 1938—the highest on the average ever recorded in Great Western territory—give some idea of what farmers in this region can accomplish with favorable agricultural conditions. For a number of years agricultural conditions were not favorable. Water was short. Farmers had to be exceedingly resourceful to harvest satisfactory crops. In other words, they had to learn to be better farmers. With that experience behind us, we can capitalize on the lessons we have learned. We are now justified in considering an "average" yield to be substantially higher than it used to be. The same effort that produced 10 to 14 tons in the "dry" years should produce 15 to 20 tons or more with normal water supplies.

With more than a million acre feet now in sight—and the months of normal heaviest precipitation still ahead of us, Colorado-Nebraska-Wheatland farmers who get their field work done early have a real opportunity to produce another high-tonnage crop. The same is true of Billings-Lovell farmers, who also have an adequate water supply in prospect.

Increasing Profits Through By-Products

By E. J. MAYNARD

FEEDING practices on beet farms in the Big Horn Basin of Wyoming are noted for efficient use of beet by-products and low fattening costs.

There is no sugar beet growing area where beet tops are better conserved, or used in fattening rations to better advantage. There is no area where climatic conditions are better for winter fattening or where better quality feeder cattle and lambs are so close and available for feeding as in the Cody and Meeteetse country.

There were 140 farmers and feeders present at the recent annual feeder's tour held at Powell. The tour sponsored by the Wyoming Extension Service, The Powell Chamber of Commerce, The Burlington Railroad, and
The Great Western Sugar Company, stressed the use of cheap and efficient rations, well protected feed lots and the abundant use of straw to produce maximum yields of manure.

Feed yards visited on the tour included those of Edgar Swallow, J. C. Krause, H. N. Williams, Paul Douglas, C. M. Burgener and Frisbie and Hill.

One of the high lights of the tour was provided by a statement made by H. N. Williams who feeds about 1,000 lambs each year.

He said, "During the past eight years, figuring all costs and a fair price for feed used, my lambs have averaged a net profit, not counting manure, of 65c per head."

He figured that in addition he secured 300 to 400 spreader loads of manure each year.

Average daily rations fed were as follows:

For Steers:
Wet beet pulp..............................70 lbs.
Grain.....................................4 to 6 lbs.
Beet tops.................................12 to 15 lbs.
Alfalfa.....................................6 lbs.
Bone meal.
Salt.

For Lambs: Lambs are being fed in two ways. The fleshy end are for the most part self fed on grain and dried pulp. The balance are carried on a limited grain feed with plenty of beet tops and alfalfa.

On the self-feeders, Edgar Swallow was feeding 1.1 lbs. of barley and oats, 1.1 lbs. dried beet pulp and ¾ lb. alfalfa, and lambs showed .37 lb. net gain per head daily at a feed cost for gain of only $4.27 per cwt.

On the cheaper growing and fattening ration, J. C. Krause was feeding ½ lb. barley and oats, 1/3 lb. of dried beet pulp, 1.6 lbs. alfalfa and about ¾ lb. of cured beet tops. These lambs were making a feed lot gain of .28 lb. per head daily at a feed cost of only $3.25 per cwt. gain.

On the following day the Lovell district held its annual live stock feeders day. Feed lots visited included those of L. L. Jolley, Leland Harris, John Fink, The Bischoff Livestock Co. and Wm. Heagney.

Rations fed to fattening lambs included 1 to 2 lbs. dried beet tops, 6 to 7 lbs. wet beet pulp, 1 lb. alfalfa hay and approximately 1 lb. of grain. Lambs from Lovell feed lots have been topping the Denver market consistently this winter.

Cattle are being fattened on a ration of 100 lbs. of wet beet pulp, 5 lbs. of grain, beet tops, and about 5 lbs. of alfalfa, and 1/10 lb. of bone meal. Gains on cattle are estimated at from 2 to 2 ½ lbs. per head daily.
Loss of Stand in Sugar Beets

By ASA C. MAXSON
In Charge of Longmont Experiment Station of the Great Western Sugar Company

It is recognized by all concerned that the stand of beets harvested is never as good as that left by the hand labor. It is equally well understood that this reduction in number of beets is brought about in numerous ways.

On the other hand the actual loss in stand, the causes for this loss, and the relative importance of the several factors at work are not so well known. An attempt to determine these points was made during the growing season of 1938.

In this investigation, the results of which are discussed here, 83 fields, at least one in each fieldman's territory, were used. In each of these, three groups of 3 rows 100 ft. long, making a total of 900 ft. of row for each field, were studied. This gave a total of 74,700 feet or 14.15 miles of row in which the hand labor left 75,573 beets. This represents 11.76 inches between beets on the average or a 102 per cent thinned stand.

The beets were counted immediately after thinning, 3, 7, and 14 days after thinning and every 14 days thereafter. At each count the number of beets lost was reported and the cause of this loss, where it could be determined, was recorded.

It must be admitted that work done on this scale should give very accurate information.

During the season May 31 to Oct. 18, 4,960 out of the 75,573 beets left by the labor were destroyed. This is a 6.55 per cent loss or 6.55 beets out of every hundred. This loss increased the distance between beets to 12.7 inches. The thinned stand was 102 per cent and the harvest stand 94.5 per cent. Therefore, the loss in stand was 7.5 per cent.

The preceding figures furnish a very good picture of the losses which occurred over the whole Great Western territory. However, we are more interested in the several causes contributing to this loss and the relative importance of each.

Ten separate causes of loss are reported. These are listed below together with the per cent of total loss caused by each in the order of their importance:

<table>
<thead>
<tr>
<th>Cause</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disease</td>
<td>3.14%</td>
</tr>
<tr>
<td>Cultivator</td>
<td>0.70%</td>
</tr>
<tr>
<td>Exposure</td>
<td>0.55%</td>
</tr>
<tr>
<td>Misc. Animals</td>
<td>0.48%</td>
</tr>
<tr>
<td>Hoe</td>
<td>0.43%</td>
</tr>
<tr>
<td>Insects</td>
<td>0.40%</td>
</tr>
<tr>
<td>Horses</td>
<td>0.25%</td>
</tr>
<tr>
<td>Unknown</td>
<td>0.24%</td>
</tr>
<tr>
<td>Storms</td>
<td>0.22%</td>
</tr>
<tr>
<td>Irrigation</td>
<td>0.04%</td>
</tr>
</tbody>
</table>

It is immediately apparent that certain of the causes listed above are largely within the control of the grower, and that others are beyond or only partially within his control.

Those which are largely within the growers' control are:

Cultivator
Exposure
Horses
Irrigation
Hoe
The cultivator losses were due to poor operation and improper adjustment of tools. Therefore, this loss could be almost entirely eliminated.

The loss by exposure resulted from the labor pulling too much soil away from the beets during thinning and to thinning when beets were too small. Proper timing of the thinning and supervision would reduce this loss materially.

Losses due to the hoe result from careless second and subsequent hoeings. Attention on the part of the grower could reduce this loss measurably.

Horses used in cultivating and spraying cause a loss that can be reduced by careful driving and proper attention to the length of eveners and neckyoke used and adjustment of the cross lines.

The loss while irrigating is due almost entirely to cutting beets out with the shovel, burying beets and field laterals. This loss can be reduced by careful work. However, it is insignificantly small on the average.

If we assume that the losses just discussed can be reduced 75 per cent, our total loss would be reduced from 6.55 to 4.58 per cent.

Losses which are less within the control of the grower but capable of reduction are:

- **Disease**
- **Insects**
- **Misc. Animals**

Black-root, Girdle-scorf, Rhizoctonia and Fusarium root rots were the principal diseases causing reduction in stand in 1938.

Black-root and Girdle-scorf are early season diseases, only operating a short time after thinning. Rhizoctonia as a root rot usually appears several weeks after thinning and continues until harvest. Fusarium root rot is a midsummer disease beginning later and continuing for a shorter time than Rhizoctonia. The losses caused by these diseases in 1938 were:

- **Rhizoctonia** .......... 17.94%*
- **Black-root** .......... 14.97%*
- **Girdle-scorf** .......... 9.27%*
- **Fusarium** .......... 3.36%*
- **Unknown** .......... 2.40%*

*Total season's loss.

Diseases generally can be reduced by proper fertilization, good seed beds, and proper rotation.

Miscellaneous animals include: Pheasants, rabbits, gophers, and stray domestic animals. These caused losses as shown below:

- **Rabbits** .......... 3.25%*
- **Pheasants** .......... 2.86%*
- **Gophers** .......... 0.70%*
- **Stray domestic animals** .......... 0.40%*

*Total season's loss.

These losses are more difficult to reduce than some others because of game laws and the habits of some animals, yet some reduction can be made.

Insects causing losses in stand are: Grasshoppers, flea-beetles, wireworms, cutworms, Blister-beetles, and webworms. Those losses due to hoppers, cutworms and webworms can be reduced by timely application of proper insecticides. Wireworm and Blister-beetle losses do not lend themselves to reduction.

Storm losses which occurred in 1938 were of such a nature that growers had practically no opportunity to reduce their severity.

If we assume it possible to reduce disease losses 25 per cent and those due to miscellaneous animals and insects by one-half, then a further re-
duction in the 1938 losses in stand of 1.22 per cent could have been made leaving the unavoidable loss 3.36 per cent. Had this been done, the harvest stand would have been reduced only to 97.7 instead of 94.5 per cent.

The nature of the losses herein discussed is such that any considerable reduction will require the attention and cooperation of growers and Sugar Company agricultural men.

The facts and figures presented here must be considered as applying only to conditions which existed during 1938.

Soil Fertility and Animal Nutrition

By DR. CHARLES H. KICK
Head of Department of Animal Husbandry, Colorado State College

Farm manure is valuable as a fertilizer chiefly as a source of nitrogen, phosphorus and potassium. These three elements, along with calcium, are the ones which must be replaced since they are the ones which are removed from the soil in largest amounts by the ordinary crops grown. If manure is not used, they must be replaced in the form of commercial fertilizers. Failure to replace these elements will eventually result in rundown soils and, therefore, decreased crop yields.

Not only does farm manure contain these four elements but the organic matter introduced into the soil tends to increase its productivity. As this organic matter breaks down it forms acids which help to make otherwise insoluble plant foods available for use by the plants. The humus formed from the organic matter tends to help the soil to retain moisture and to improve the texture.

Manure also has a beneficial effect in that it contains bacteria which act upon materials in the soil and liberate plant food.

Fortunately for the livestock farmers, those elements (nitrogen, phosphorus, potash and calcium) required by plants in relatively large amounts, are required by animals in very small amounts and are recovered in high percentages in the manure.

These fertilizing constituents found in manure depend entirely on the amounts present in the feed. The animal is not capable of making any of the fertilizing elements. The value of the manure from a fertilizing standpoint depends on the amounts of the elements present in the feed and the amounts of the feed fed. Only feeds rich in fertilizing elements make rich manure.

The proportions of the fertilizing constituents of the feed found in the manure also depends on the age and kind of animal fed. For example, a mature, working horse which does not gain in weight will excrete in the manure practically all the nitrogen, phosphorus, potash and calcium in the feed which it is fed.

On the other hand, a young, growing animal requires, for the forma-
Dr. Kick points out that it is a fortunate fact that animals require only small amounts of important elements which growing plants require in relatively large amounts—consequently such important elements as nitrogen, phosphorus, potash and calcium, are recovered in high percentages from manure. Animals, like those above, are always a sign of better farming: upper left, Pat McLoughlin's market-topping cattle at Merino; right, Fred J. Miller of Sterling and some of his Hampshire swine; lower left, Paul Blood among his lambs at Lyman; and Carl A. Roth of Windsor with one of his fine stallions.

According to W. H. Pierre, West Virginia Experiment station, "Phosphorus has sometimes been called the master key to agriculture," because he attributes low production more often to lack of phosphorus than lack of any other element. Low phosphorus content, he points out, means not only delayed maturity and poor plant growth, but also low phosphorus content of the plant itself. Thus animals fed crops from phosphorus-deficient soils, grow poorly and develop diseases corrected only by supplying phosphorus to their ration.
ration will excrete in the manure about % of the nitrogen and phosphorus which they consume in their feed. Fattening pigs return about 85% of the nitrogen and 96% of the phosphorus and potash of their ration in the manure. A rough estimate of the fertilizing constituents of the feed of farm animals which is returned in the manure would be about 80%. On dairy farms, this would fall somewhat lower.

Using values of 11 cents/pound for nitrogen, 5 cents/pound for phosphoric acid and potash, and assuming that only about 50% of the nitrogen and 70% of the phosphoric acid and potash is recovered in the manure, the following table gives the manurial value of some feeds:

<table>
<thead>
<tr>
<th>Fertilizing Constituents</th>
<th>Fertility Value</th>
<th>Manurial Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen</td>
<td>Per Ton</td>
<td>Per Ton</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Potassium</td>
<td>%</td>
<td>%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Concentrates</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn, Dent, No. 2</td>
<td>1.50</td>
<td>0.27</td>
</tr>
<tr>
<td>Oats</td>
<td>1.92</td>
<td>0.33</td>
</tr>
<tr>
<td>Wheat</td>
<td>2.10</td>
<td>0.43</td>
</tr>
<tr>
<td>Wheat Bran</td>
<td>2.53</td>
<td>1.32</td>
</tr>
<tr>
<td>Soybeans</td>
<td>5.90</td>
<td>0.60</td>
</tr>
<tr>
<td>Linseed Meal</td>
<td>5.63</td>
<td>0.86</td>
</tr>
<tr>
<td>Cottonseed Meal, 48% protein grade</td>
<td>6.91</td>
<td>1.11</td>
</tr>
<tr>
<td>Tankage, 60% protein grade</td>
<td>9.31</td>
<td>6.21</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Roughages</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Timothy Hay</td>
<td>0.99</td>
<td>0.14</td>
</tr>
<tr>
<td>Red Clover Hay</td>
<td>1.89</td>
<td>0.18</td>
</tr>
<tr>
<td>Alfalfa Hay</td>
<td>2.35</td>
<td>0.21</td>
</tr>
<tr>
<td>Oat Straw</td>
<td>0.64</td>
<td>0.13</td>
</tr>
<tr>
<td>Corn Silage</td>
<td>0.87</td>
<td>0.06</td>
</tr>
</tbody>
</table>

The value of farm manure varies widely depending on the type of bedding and the kind and amount of feeds fed. The following is a table showing the value of fresh farm manure:

<table>
<thead>
<tr>
<th>Percentage Composition</th>
<th>Pounds Per Ton</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>Nitrogen</td>
</tr>
<tr>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Horses</td>
<td>59</td>
</tr>
<tr>
<td>Dairy Cattle</td>
<td>79</td>
</tr>
<tr>
<td>Fattening Cattle</td>
<td>78</td>
</tr>
<tr>
<td>Sheep</td>
<td>64</td>
</tr>
<tr>
<td>Swine</td>
<td>74</td>
</tr>
<tr>
<td>Hens*</td>
<td>55</td>
</tr>
</tbody>
</table>

*without litter.
A New Approach Toward Worm Control in Feeder Lambs

DR. N. J. MILLER, Eaton

During the past few years, the prevalence of intestinal worms in feeding lambs has been increasing to a degree that they have caused the feeders of Northern Colorado to become alarmed about their frequency and numbers. This alarm has been manifested by an ever increasing attempt to eliminate them by drenching the lambs with various compounds.

Worms have recently been held responsible by many feeders for much of the death loss which is really caused by other conditions, and in which the worming treatment is not only useless, but detrimental. Losses up to as high as 14% have occurred this year which were traceable directly to the administration of worming compounds. All drugs used to destroy worms are toxic to some degree, and the conditions under which they are administered should be carefully studied.

Veterinarians do not consider worms responsible for death loss in feeding lambs in the same degree as do the feeders themselves. They do, however, admit that worms in any great numbers are detrimental to the lamb even if not responsible for its death.

Stomach worms and the large tapeworm (Monezia Expansa) are both responsible for death loss in breeding flocks, but their presence so far in the feeding lambs has not caused much alarm except for the fact that they seem to be increasing in numbers and frequency. Liver Flukes, while not common in the Northern Colorado feed pens, have been recognized and are detrimental to the well being of the lambs.

It is the fringed tapeworm (Thy- sanosoma Actinoides) which is held responsible by many feeders of our district to be the cause of their high death rate. This is true because, upon autopsy, the forms are found often in large numbers in the hepatic duct and the smaller ducts of the liver itself. Veterinary pathologists consider them of little significance in relation to death loss. I refer to Bulletin 448, "Lamb Diseases in Colorado Feed Lots," by Doctors I. E. Newsom and Frank Thorp, Jr., Colorado State College, Colorado Experiment Station, Fort Collins, Colorado. These men in their bulletin also say under the heading of Treatment, "No satisfactory treatment for the fringed tapeworm has been discovered."

Here are the facts, concerning the fringed tapeworm, as recognized by the veterinary profession. First—They are increasing in frequency. Second—They probably rarely cause death. Third—No treatment has been discovered for their removal. Fourth—It is not death loss in the feed pen, but rather economic loss from liver condemnation in the slaughter house that should concern the feeder. Fifth—The practice of drenching lambs for this condition, as followed by many feeders, has not only proved to be useless, but in many cases dangerous.

It is the author's opinion that the individual feeder's pen is not the battleground upon which the fight against these worms should be made. It is rather a problem for the entire sheep feeding industry of Northern Colorado, through its association, to enlist the aid of the United States Bureau of Animal Industry, the Live
Stock Sanitary Boards of the various range states, and all other live stock sanitary organizations in an effort to study the problem of reducing the infestation of the lambs on the range as much as possible. The old saying, “An ounce of prevention is worth a pound of cure,” could well apply in this condition.

Sheep feeding has been an established industry in Northern Colorado for many years, and will, no doubt, be carried on for years to come. Collective efforts of control of universal problems should be their most economical solution. Recommendations made by the Sheep Feeders Association, representing the industry in Northern Colorado alone, should carry considerable weight in an effort of this kind.

I believe the Sheep Feeders Association should be represented at the Intermountain Live Stock Sanitary Association meetings held in Salt Lake City each year. The membership of this association is composed of men representing all live stock interests in the so-called western or range states, in which most of our feeding lambs are raised. Problems of common interest could be presented and discussed at such a meeting.

I firmly believe that such a plan as I have outlined would, in time, produce more beneficial results, with less expenditure, than is now being required for individuals to carry on their fight year after year, with no relief in sight.

The practice of worming lambs in the feed pens is somewhat like the wife’s hat, not worn because it looks well, but because it is stylish. Just so with the drenching treatment which is given, not because of beneficial results, but because the neighbors drench theirs. “Follow the leader” may be all right for the lambs themselves, but the time has come for the feeders to do some individual thinking about their problems of economic loss in the sheep feeding industry.

Buffalo Roundup

Tom Propst, Luke Propst, Dallas Landrum, James Talbott, and Walter Witt, farmers and former cowboys of the Sterling district, had the distinction of helping to round up and drive to market a herd of buffalos. These men report herding buffalos is the hardest job they ever attempted, as the buffalos will not stop for fence, man or horse, and they will not bunch like cattle. An interesting sidelight of the buffalo drive was that the Burlington dispatcher sent out an order on the Holdredge-Sterling line to “watch out for buffalos on the track.” Since that time requests from all parts of the United States have come for copies of that order.

Fred J. Miller of the Sterling district can attribute his success as a beet farmer in part to his live stock operations. Fred feeds sheep, maintains a herd of 18 to 20 pure bred Holstein milch cows and keeps a swine herd of from 40 to 60 Hampshires. Foundation stock was secured by the Millers from the Kansas farm of E. C. Quigley, famed National Baseball League umpire, who breeds pure bred Hampshire hogs as a hobby.

John Klein, Sr., of Fort Lupton, thought last spring that the stand was too poor to leave. This fall, his beet field averaged over twenty tons per acre.
“C” Molasses Is Proving Valuable With Cut Fodder and Hay.

“C” Molasses Improves the Ration

GREAT Western “C” Molasses is becoming increasingly popular with all feeders who are using it. This high-protein molasses works excellently with cut fodder and hay.

The upper left picture shows a group of fine steers from the pens of George Kern and Harry Farr, Windsor. These steers were fattened on a ration to which was added corn fodder mixed with “C” molasses. They were shipped to market a few days after this photograph was taken.

The lower photograph shows Christ Heinze, Severance, grinding fodder and mixing “C” molasses at the same time. Last winter Mr. Heinze was short of alfalfa hay to feed his steers and was able to purchase a field of corn fodder from a neighbor. The fodder was ground and mixed with “C” molasses with very satisfactory gains resulting.

John Weitzel of Windsor is shown at the right beside a stack of alfalfa and “C” molasses fresh from the mixer. He finds that he makes much better use of his alfalfa when it is fed with this molasses.

Rotation of crops, with use of pure seed, is the most effective means yet devised for keeping land free of weeds. Of about 1,200 species of plants commonly called weeds in the United States, less than 30 are sufficiently aggressive to be able to survive indefinitely on crop-rotated land. These are the super-weeds, the so-called noxious species, mostly perennials, with spreading or creeping root systems, or underground parts such as bulbs uninjured by tillage. A few annuals, notably wild oats and crabgrass, are so resistant to extermination that they may be classed as noxious.
IN 1938 THERE were 530 sugar beet growers who averaged 20 or more tons per acre in territory served by The Great Western Sugar Company in Colorado, Nebraska, Wyoming and Montana.

The five contracts with the highest tonnage per acre were:
1. John and Henry Stroh, Longmont, 26.24 tons per acre.
2. R. B. Lebsack, Eaton, 25.34 tons per acre.
3. J. M. Chapman, Brush, 25.22 tons per acre.
5. H. H. Urich, Eaton, 24.73 tons per acre.

In compiling the honor roll by factory districts, a study was made of the ten highest yields on contracts of 10 acres or more in each district.

Additional names are given of growers who harvested 20 tons per acre or more on contracts of less than 10 acres, and growers who harvested 20 or more tons on 10 or more acres, yet did not qualify among the first high ten.

By factory districts, the listings are as follows—a tribute to what can be accomplished by good farming methods under favorable agricultural conditions:

**Eaton**

THE honor roll of the ten high-yield growers in the Eaton district for 1938 includes three men who stood among the first five among all growers served by The Great Western Sugar Company in Colorado, Nebraska, Wyoming and Montana. R. B. Lebsack, who heads the Eaton list with 25.34 tons per acre, had the second highest yield in Company territory as a whole. Arnold Dalton, with 25.17 tons was second at Eaton and fourth among all growers; and H. H. Urich, with 24.73 tons, was third at Eaton and fifth among all growers.

The first ten at Eaton, with contracts of 10 acres or more, continues with J. R. Sitzman, 24.47 tons on 33.4 acres; Adolph Sitzman, 24.31 tons on 18 acres; Roy Leafgren, 23.99 tons on 16.7 acres; John H. Eckhardt, 23.86 tons on 46.7 acres; Fred E. Cozens, 23.82 tons on 12.3 acres; L. A. Tittle, 23.68 tons on 15.9 acres; and H. V. Balmer, 23.61 tons on 17.2 acres.

Eaton growers who harvested 20 or more tons per acre, regardless of acreage included Henry Kahler, Herman Magnuson, Eben and Augusta Bostrom, W. A. Barnett, Carl E. Lofgren, O. C. Sullivan, Einar Nelson, George Lebsack, J. P. Romans, Berger


THE honor roll of ten Greeley farmers who harvested the highest tonnage per acre of sugar beets in 1938 on 10 or more acres was as follows: J. F. McAvoy, 22.52 tons on 35.9 acres; Martin Smits, 22.05 tons on 14.2 acres; L. A. Tittle, 21.79 tons on 12.9 acres; Earl Cogburn, 21.78 tons on 11 acres; J. A. Johnson, 21.67 tons on 14 acres; Conrad C. Herbst, 21.48 tons on 18.5 acres; O. H. Shearer, 21.46 tons on 10.2 acres; Joseph A. Johnson, 20.69 tons on 21.9 acres; Roy Kohler, 20.67 tons on 18.9 acres; and Harlem McLeod, 20.55 tons on 26.4 acres.

Growers in the Greeley district who harvested 20 or more tons per acre in 1938, regardless of the size of the

Windsor

The honor roll of ten growers in the Windsor factory district who harvested the highest tonnage per acre of sugar beets in 1938 on 10 or more acres was as follows: Theodore Peterson, 23.11 tons on 11.6 acres; Arthur A. Leafgren, 22.43 tons on 19.9 acres; Carl Severin, 22.04 tons on 30 acres; Adam Ruff, Jr., 22 tons on 20 acres; Henry Swanson, 21.99 tons on 14.7 acres; John Granat & H. L. Witbeck, 21.83 tons on 24.9 acres; Richard Witbeck, 21.62 tons on 15.5 acres; Otho Wykert, 21.45 tons on 30.6 acres; Pete Simon, 21.43 tons on 11.6 acres; and Donald Winder, 21.41 tons on 24.4 acres.


Fort Collins

The 1938 honor roll of ten growers in the Fort Collins district who harvested the highest average yield of sugar beets per acre on 10 or more acres was as follows: C. F. Mauser, 22.86 tons on 30.5 acres; Pauline Watson, 22.85 tons on 27.7 acres; E. Znamenacek, 21.44 tons on 27 acres; Fred Coutts, 21.29 tons on 28.8 acres; John Amen, 20.88 tons on 27 acres; Victor W. Norman, 20.59 tons on 21.9 acres; Godfred Becker, Jr., 20.56 tons on 32.2 acres; J. R. Bay and Henry Kamerzell, 20.54 tons on 24.5 acres; Gerhart Brunner, 20.51 tons on 17.2 acres; and Robert H. Walker, 20.47 tons on 35.5 acres.

Included in the Fort Collins list of growers who harvested 20 tons or more per acre of sugar beets in 1938,....
Alex and Pauline Watson

regardless of the size of the acreage were: Fred Feit, Richard Greenwalt, G. F. Morton, Adam Wagner, Harry Winter and Albert Baechler.

Loveland

IN THE Loveland factory district the honor roll of ten growers who in 1938 harvested the highest yield of sugar beets per acre on 10 or more acres was as follows: W. R. Saulcy, 22.14 tons per acre on 22.62 acres; George W. Lee, 22.14 tons on 11.90 acres; Jack O. Cavender, 22.11 tons on 16.82 acres; D. R. Pulham, 22 tons on 31.14 acres; George A. Kauffman, 21.68 tons on 44.65 acres; W. A. Frazier, 21.61 tons on 11.82 acres; Reuben Brehm, 21.53 tons on 21.85 acres; Edward Frazier, 21.38 tons on 10.80 acres; Alpheus Cox, 21.35 tons on 15.99 acres; and John Krieger, 21.24 tons on 10.85 acres.

Loveland growers who averaged 20 tons or more per acre of sugar beets, regardless of the size of the acreage in 1938, included the following: Ellis F. Cavender, J. H. Gentry, Oscar E. Hanson, Joe Kauffman, Roy A. Peterson, Joe King, John Schaffer, W. A. Yeager, Henry Glantz, Charles W. Lucas, Pete Sterkel, Oscar G. Swanson, George Spomer, David Peterson,

Mr. and Mrs. George W. Lee and their beautiful modern home.


Longmont

THE Longmont high-tonnage list of ten growers with highest average yield of sugar beets per acre on 10 or more acres in 1938 is headed by John and Henry Stroh (see front cover), who also have the honor of the highest yield per acre—26.24 tons—
among all growers in territory served by The Great Western Sugar Company in Colorado, Nebraska, Montana and Wyoming.

The Longmont "high ten" honor roll is as follows: John and Henry Stroh, 26.24 tons per acre on 30.11 acres; N. E. Thondson, 23.65 tons on 18.67 acres; Walter Carlson, 23.50 tons on 28.88 acres; Grant Hartman, 22.94 tons on 17.25 acres; R. S. Wilson, 22.92 tons on 28 acres; John and Henry Ullman, 22.91 tons on 23 acres; Ivan Baller, 22.86 tons on 19.28 acres; Maurice Beauprez, 22.80 tons on 21.67 acres; N. E. Thondson, another contract averaging 22.76 tons on 26.75 acres; and Harold W. Anderson, 22.71 tons on 18.35 acres.


The reservoirs that are filled from the Little Thompson and Big Thompson rivers have more irrigation water stored at this time than for several years. This, with present soil moisture, makes the prospects very good for the 1939 crop.

Brighton

The 1938 honor roll of ten Brighton growers with the highest average yield per acre on 10 or more acres is as follows: L. J. Ehlen, 23.23 tons on 15.3 acres; August H. Ehlen, 21.56 tons on 15 acres; Edward C. Schaefer, 20.45 tons on 20.2 acres; E. J. Ehlen, 20.23 tons on 12.5 acres; Charles Betts, 20.06 tons on 18.1 acres; Ben Sebold, 19.84 tons on 16.9 acres; A. Nordstrom, 19.76 tons on 14.1 acres; John Roskop, 19.74 tons on 28.3 acres; Carl Henkel, 19.61 tons on 15.3 acres; and John Krosky, 19.6 tons on 21.1 acres.

In the Brighton district K. Kawakami and John Sack averaged more than 20 tons per acre on contracts of less than 10 acres in 1938.
In the Fort Lupton district the honor roll for 1938 included the following ten growers with highest tonnage per acre of sugar beets on contracts of ten or more acres. Dave Weimer, 22.71 tons on 10 acres; John Bernhardt, 21.79 tons on 28.42 acres; J. M. Alden, 21.53 tons on 19.70 acres; Floyd D. Elmore, 21.30 tons on 16.03 acres; Joe Wuertz, Jr., 21.05 tons on 52.43 acres; T. Koshto, 20.89 tons on 17.87 acres; William Rosenbrock, 20.46 tons on 13.25 acres; W. A. Barkley, 20.46 tons on 19.86 acres; Henry H. Harms, 20.37 tons on 27.65 acres; and Andrew Wuertz, 20.34 tons on 46.53 acres.

Other growers in the Fort Lupton district who in 1938 averaged 20 tons or more per acre, regardless of the amount of acreage contracted, included: Wilferd Luft, A. E. Sickler, Benjamin Lopez, Merl E. Dunham, Weicker Investment Company, George Hilt and Orville B. Shaklee.

Vernon L. Reeves, 21.83 tons on 11.29 acres; Rene J. Martin, 21.30 tons on 15.29 acres; Leslie B. Kimberly, 21 tons on 24.71 acres; Alex Karg, 20.83 tons on 26.32 acres; L. R. Morley, 20.16 tons on 14.09 acres; Marjorie M. French, 19.69 tons on 31.15 acres; Herman Shade, 19.45 tons on 17.35 acres; Con Koehler, 19.57 tons on 28.72 acres; Dick Harms, Jr., 19.37 tons on 27.71 acres; and Erwin H. Schulz, 19.25 tons on 17.31 acres.

Ovid growers harvesting 20 or more tons per acre on less than 10 acres included Carl Schaefer, Fred Jensen, J. M. Andersen and Albert Spomer.

More water for Fort Morgan farmers! Two new wells were recently completed in the Hoyt district, one on the Hoyt place and the other on the H. W. Bigler place. Both wells will produce around 1500 gallons per minute.
Sterling

IN THE Sterling factory district the ten growers with the highest tonnage of sugar beets per acre on contracts of 10 or more acres in 1938 make up the following honor roll: A. F. Sperry, 23.34 tons on 11.17 acres; K. Mori, 23.10 tons on 22.76 acres; Alex Fiebig, 21.90 tons on 34.11 acres; George Wacker, 21.90 tons on 19.70 acres; John Bianco, 21.75 tons on 20.20 acres; Conrad Luft, 21.48 tons on 31.20 acres; Joe Bianco, 21.18 tons on 29.05 acres; A. Facchinello, 20.69 tons on 13.35 acres; Fred Brunkhardt, 20.66 tons on 25.30 acres; Antonio Rizzolo, 20.49 tons on 31.38 acres; and W. W. Brown, 20.48 tons on 33.05 acres.

Many other growers in the Sterling district, in addition to the foregoing high ten, harvested an average of 20 or more tons of beets per acre, including: Victor Hessler, Alex Hettinger, Elizabeth Hettinger, Olg. D. Nogore, John A. Monheiser, David K. Amen, P. J. Quint, C. A. Roth, Pedroni Brothers, Ramey Brothers, Jacob Stieb, John Mari, Sr., Con Bauer, and George Heil.

Brush

THE high-yield honor list of Brush growers for 1938 is headed by J. M. Chapman, whose yield of 25.22 tons per acre on a contract of 24.76 acres was third highest in all territory served by The Great Western Sugar Company in Colorado, Nebraska, Wyoming and Montana, on contracts of 10 acres or more.

Following Mr. Chapman in the “high-ten” classification of growers with contracts of 10 acres or more were: Adam Beck, 23.10 tons on 15.11 acres; George Miller, 22.61 tons on 26 acres; Miller and Rediess, 22.17 tons on 44.09 acres; Carl Reichert, 22.08 tons on 20 acres; Jacob Bickert, Jr., 22.03 tons on 49.46 acres; Jacob Stumpf, 21.97 tons on 32.28 acres; D. E. Wind, 21.96 tons on 34.99 acres; James E. Hunt, 21.81 tons on 10.89 acres; and Homer Mortensen, 21.24 tons on 10.26 acres.

Many other high yields were recorded in the Brush district. On a contract of 9.46 acres Chris Danielson averaged 25.98 tons per acre, one of the outstanding yields of all terri-
tories. Other growers in the 20-plus ton group, regardless of the size of the acreage, included Henry C. Hoff-
man, George Wolf, George Needens, Jess Winn, Ray J. Winger, G. and George G. Walter, Dan Emhovick, F. H. Honebein, George H. Reichers, Wiley Thomason, Jacob Bott, P. Hul-
kovich, Mary A. Cook, and Otto Clegg.

Fort Morgan

The ten Fort Morgan contracts with the highest yield per acre of sugar beets on 10 or more acres in 1938 make up the following honor roll:
Jacob Schlott-
hauer, 22.38 tons on 38 acres; John Weimer and Henry Buxman, 21.95 tons on 19 acres; David Neb, 21.72 tons on 24 acres; D. J. Greenwald, 21.68 tons on 25.20 acres; Jacob Kechter, 21.12 tons on 18 acres; Jacob Dill and John Dill, 20.87 tons on 12 acres; R. H. Dahm, 20.77 tons on 24.28 acres; G. H. Schneider, 20.67 tons on 33.02 acres; Henry Schwindt, Sr., 20.41 tons on 10 acres; and G. F. Lenhart, 20.20 tons on 13.42 acres.

Growers at Fort Morgan who averaged 20 or more tons per acre, regardless of the size of the acreage, included Carl Meininger, Roy W. Martindale, Willi-

William Martindale, H. E. Graves, W. J. Ott and Henry Schlottthauer.

Scottsbluff

The 1938 honor roll of Scottsbluff sugar beet growers who made up the highest ten average yields on contracts of 10 or more acres was as follows: Lawrence Baltes, 21.94 tons on 11.38 acres; H. E. Blackburn, 21.73 tons on 37.51 acres; Hale Brothers, 21.62 tons on 15.07 acres; H. C. Polley, 21.38 tons on 12.32 acres; George Dorsch, 21.34 tons on 28.33 acres; Mary Burbach, 20.78 tons on 94.58 acres; Lawrence Baltes, another contract averaging 20.56 tons on 15.35 acres; Charles Hills, 20.38 tons on 22.37 acres; George Knaub, 19.99 tons on 18.77 acres; and Dale Dixon, 19.99 tons on 18.89 acres.

Among the Scottsbluff growers who averaged 20 or more tons per acre on contracts of less than 10 acres were: Alvin Prouty, W. G. Kellett, Lester Kaasch, Joe Carmichael, Roy E. Kronberg, J. C. Steele and O. H. Ward.
(1) C. E. Graves is a prominent landowner and farmer. Mr. Graves feeds out about the same number of cattle each year—120 head. Beet tops have an important place in his feeding operations.

(2) Alex Ostwald in the feed lot of Crouch & Son. Mr. Ostwald is feeding the 150 head of heifer calves for Mr. Crouch. At the present time the calves are receiving a ration of wet pulp and alfalfa hay.

(3) Carl G. Friehauf, who farms an 80-acre farm, feeds from 500 to 600 lambs each year. This year he has 570 lambs on feed. He has had an exceptionally good gain and was recently ready to ship his first car load to market.

(4) Guy Kammerer, feeding 56 head of cattle. In the foreground are beet tops properly stacked for feeding. Beet tops and beet pulp have a prominent place in Mr. Kammerer's feeding operations.

(5) The Lauck Brothers, Henry and Sam, are fast becoming two of Morgan County's most progressive farmers. Last spring they bought a 160-acre
farm that had grown no beets the two previous years. At once they began to improve the place by modernizing the house, building a new barn and installing a pumping plant that throws about 3 feet of water. In the fall of 1938 they harvested 30.25 acres of sugar beets with a yield of 15.60 tons per acre. Corn and barley showed a correspondingly high yield. This winter Henry and Sam have been busy feeding 44 head of steers.

Gering

A VERAGE yields of sugar beets ran so high in the Gering, Nebraska, territory in 1938 that everybody in the first “high-ten” group, on contracts of 10 or more acres, harvested better than 22½ tons per acre.

The Gering honor roll of high-tonnage growers was as follows: C. A. Buehler, 24.01 tons on 35.95 acres; David Wiedeman, 23.65 tons on 10.48 acres; Homer L. Johnston, 23.52 tons on 23.85 acres; Alex Meisner, Jr., 23.44 tons on 17.23 acres; L. G. Lockhart, 23.10 tons on 17.72 acres; John W. Casson, 22.96 tons on 17.32 acres; Henry Ziegler, 22.86 tons on 28 acres; Carl Brackman, 22.59 tons on 40.92 acres; Henry Johannes, 22.41 tons on 20.93 acres; and C. B. Sands, 22.39 tons on 12.19 acres.


Bayard

THE 1938 honor roll of beet growers in the Bayard, Nebraska, district who harvested the ten highest yields on contracts of 10 or more acres was as follows: F. E. Berquist, 22.35 tons on 26.49 acres; Adam Kerbel, 21.69 tons on
42.98 acres; Thomas Megas, 21.38 tons on 42.25 acres; Conrad Kniss, 20.50 tons on 47.27 acres; George H. Gartman, 20.44 tons on 47.25 acres; George J. Herrmann, 20.26 tons on 29.71 acres; Frank E. Robinson, 20.25 tons on 11.42 acres; John Mittelsteadt, 20.07 tons on 12.26 acres; B. W. Moore, 20.07 tons on 30.22 acres; and Christ Theros, 19.82 tons on 48.34 acres.

Henry Fritzler averaged 20.48 tons per acre on a contract of less than 10 acres.

Minatare

IN THE Minatare district in 1938 the first ten growers with highest tonnage of sugar beets per acre on contracts of 10 acres or more all averaged above 20½ tons per acre. This honor roll is as follows: Edward Brackman, 23.20 tons on 10.27 acres; Alex Schmunk, 22.90 tons on 52.84 acres;

Henry Weimer, 22.40 tons on 40.64 acres; Charles Hinman, 22.12 tons on 36.98 acres; Robert O. Redding, 21.76 tons on 22.60 acres; Fred Weber, 21.36 tons on 37.62 acres; Fred Weber, another contract averaging 21.05 tons on 25.43 acres; Harris Schroeder, 20.96 tons on 44.67 acres; Peter Schafer, 20.81 tons on 49.09 acres; and C. P. Kilthau, 20.69 tons on 49.68 acres.

Other Minatare growers averaging 20 tons or more per acre, some on contracts of less than 10 acres, included: Harry Crabill, George O. Howard, Earl Johns, David Kaufmann, Pete Aschenbrenner, Henry Braun, Philip Schlager, Dale Redding and Henry C. Hessler.

Mitchell

IN THE Mitchell, Nebraska, district in 1938, more than 21 tons per acre was averaged by each of the ten growers with the highest yields of sugar beets on 10 or more acres. This honor roll is as follows: Peter Vogel, 22.89 tons on 37.23 acres; George E. Casson, 22.48 tons on 15.05 acres; E. H. Jans-
sen, 22.21 tons on 17.86 acres; William Ledingham, Jr., 21.79 tons on 28.97 acres; Albert Nix, 21.68 tons on 20.46 acres; Feagler and Hoffman, 21.50 tons on 30.34 acres; H. J. Lenhart, 21.49 tons on 12.82 acres; M. N. Travis, 21.48 tons on 19.83 acres; J. P. Lenhart, 21.42 tons on 18.97 acres; and Henry Peppler, 21.32 tons on 41.72 acres.

Others in the Mitchell district who averaged 20 tons or more of beets per acre included: George Walter, Henry Stuckert, Garrett Brothers, Dave Miller, Lester Dedrich, H. O. Parker, I. E. Pickrell, Earl S. Walker, and Edward Weitzel.

Lyman

The ten Lyman, Nebraska, beet growers with the highest average yield per acre in 1938 on 10 or more acres, each harvested better than 20¼ tons per acre. The Lyman honor roll in this acreage classification, is as follows: Rollie H. Miller, 23.78 tons on 10.30 acres; G. W. Gompert, 22.12 tons on 12.06 acres; Homer Hildebrand, 21.21 tons on 10.22 acres; Rudolph Reder, 21.16 tons on 24.33 acres; C. M. Kellums and Arthur Kellums, 20.95 tons on 30.42 acres; Jack Reichert, 20.90 tons on 63.18 acres; J. L. Lippincott, 20.85 tons on 90.47 acres; C. M. Kellums, another contract averaging 20.82 tons on 49.32 acres; John Hort, 20.82 tons on 19.30 acres; and H. K. Nakada, 20.77 tons on 24.49 acres.

Other Lyman growers who averaged more than 20 tons per acre on the 1938 beet crop were: Minnie L. Gregory, Roy Mort, Tom Mort, Jack Heinz, Jr., C. R. Howell, Ben Kohllepel, Robert Stitt, Jacob Weinmeister, John Chalupa, LeRoy Failor, Peter Heil and R. O. Kirkpatrick.

Wheatland

E. B. May (right) and His Son Woodrow

The ten growers in the Wheatland, Wyoming, district who harvested the highest yields of sugar beets per acre on 10 or more acres in 1938 were: Minnie L. Gregory, Roy Mort, Tom Mort, Jack Heinz, Jr., C. R. Howell, Ben Kohllepel, Robert Stitt, Jacob Weinmeister, John Chalupa, LeRoy Failor, Peter Heil and R. O. Kirkpatrick.

D. L. Benedict of Iliff, Colorado, is to be congratulated on his recent marriage to Miss Emma Schilling, daughter of his neighbor, Conrad Schilling. Tom Monroe of Iliff "rang the bell" with a 20-ton yield the first time he had a contract in his own name.
1938 make up the following honor roll:

E. B. May, 19.06 tons on 50.46 acres; Doval Johnston, 17.57 tons on 30.35 acres; Henry Geringer, 17.42 tons on 30.89 acres; A. A. Suntych, 17.18 tons on 46.75 acres; G. E. Graefe, 16.66 tons on 11.56 acres; G. W. Goodrich, 16.61 tons on 72.20 acres; James H. McGuire, 16.57 tons on 18.50 acres; Marlin Baker, 16.53 tons on 12.41 acres; O. J. Brown, 16.35 tons on 60.80 acres; and M. C. Short, 16.14 tons on 21.66 acres.

The highest yield in the Wheatland district was 23.84 tons per acre grown by Francis A. Axford on 2.04 acres.

Billings

IN THE Billings, Montana, district in 1938 the ten contracts with the highest average yield of sugar beets per acre on 10 or more acres comprise the following high-tonnage honor roll: I. F. Hill, 20.67 tons on 11.60 acres; George and Jacob Staley, 20.58 tons on 62.27 acres; Leon Sian, 20.24 tons on 16.10 acres; Lawrence Bauwens, 20.20 tons on 36.90 acres; Jacob Lackman, 20.17 tons on 22 acres; P. F. McVey, 19.84 tons on 37.01 acres; H. E. Lackman, 19.69 tons on 25 acres; Alex Leber, 19.59 tons on 11.00 acres; Charles Gutteridge, 19.53 tons on 24.46 acres; and George Kratochvil, 19.15 tons on 23.70 acres.

Billings growers who averaged 20 tons per acre or more on contracts of less than 10 acres included: John Sitzman, R. and W. Becker, Tom Daugherty, Louis Stringari, Guy E. French, Albert Juhl, Henry Yerger and Earl Zahller.
HERE is the honor roll of growers in the Lovell, Wyoming, factory district who in 1938 harvested the ten highest yields of sugar beets on contracts of 10 or more acres: J. F. Brosious, 20.16 tons on 20.60 acres; Thomas A. Keele, 19.02 tons on 21.42 acres; J. F. Brosious and A. J. Brosious, 18.98 tons on 68.83 acres; Clayborn Jones, 18.92 tons on 16.18 acres; Karl Fink, 18.78 tons on 114.98 acres; W. F. Heagney, 18.83 tons on 80.04 acres; T. J. Hill, 18.69 tons on 19.29 acres; Montgomery and Sproul, 18.54 tons on 205.43 acres; Kamiel Wambeke, 18.54 tons on 40.38 acres; Eldon Harris, 18.48 tons on 13.89 acres; and Frank Spencer, 18.25 tons on 17.22 acres.

Mr. and Mrs. Joe Speckner, of the Scottsbluff factory territory, are the proud parents of a daughter, born at Fairacres Hospital in Scottsbluff, on December 14. Mrs. Speckner is a niece of Math Schumacher of Minatare who passed away recently.

L. B. (Rosy) Shuttlesworth, Sears station, Lyman, produced 19.89 tons of beets per acre on 35.82 acres after having a severe hail on his crop when thinning was about two-thirds completed. Rosy has rented the Fern Ryan farm for this coming year and will farm it in addition to the place he lives on.

J. C. McBride and wife of the Gallagher community, Montana, spent several weeks recently visiting relatives and friends in Rocky Ford and other Colorado points.
Mr. D. N. Plummer and Ezra Plummer, son and business partner, Redus dump, growers in the Mitchell district, have been levelling on Mr. Plummer's farm with a tractor Fresno and steel land leveller. Very few days this winter, they stated, have they been unable to work the ground because of cold weather. Their efforts are but a continuation of twenty-five years of lowering irrigation costs and improving yields through levelling and of improving yields through fertilization.

Paul Blood, Stegall station, Lyman, is feeding 3960 head of lambs and ewes, also 109 head of heifers at his two feed yards. Paul has been putting exceptionally good gains on his lambs. He is feeding them steam-rolled molasses barley, a concentrate, alfalfa hay, pressed pulp and tops. The ewes are being fed pressed pulp and tops.

John DeVries of Shepherd, Montana, is moving from his present location to the farm just west of Shepherd previously farmed by Wm. Rommick.

John Boxberger, Jr., Sinnard station, Fort Collins, is doing an excellent job of building up the fertility of the farm he rented a year ago from Mrs. Luella Postin. All the corn, grain and hay produced on this place together with the beet tops and pulp will be fed to 70 head of cattle in the yards Mrs. Postin recently built.

Ralph Nipple of the Howard district, Billings, is feeding a bunch of lambs this year for the first time. He recently shipped his first carload to market.

Henry Stratmann is operating a sand pit on the T. R. Norcross farm at Bird dump, Loveland district. He is furnishing the sand for construction of the new Junior High School in Loveland. Matt Sappington, superintendent of the Hillsboro Ditch, is operating the Ditch Company's dragline there.

A car crash on the Billings-Laurel highway involved Mr. and Mrs. Arthur LaMotte who live west of Billings. They were both seriously injured and at present are at home recovering from these injuries.

Kent Lane, Sears station, Lyman, seeded a blue grass lawn and did some other landscaping this fall to help beautify his new home.

Arthur Van Thuyne has moved on to the farm he purchased last fall, four miles south of Longmont.

Edward Johnson has been employed at Pinedale, Wyoming, the past few months. He was a civil engineer for the Green River Investigations Project there. Edward is a former Colorado State College student and the son of Wesley Johnson of Fort Collins.

The Equitable Life Insurance Company of Iowa has drilled a successful well on their land two miles west of Sidney, Nebraska. Improvements have been built on the place. Mr. M. L. Westergaard, branch manager, has leased this farm to Henry Haupt, a beet man from the North Platte valley.

James E. Eddleman, a retired building contractor of Bayard, recently purchased the George Hanna estate quarter in the South Bayard territory, formerly farmed by Alec Baird.

Work is scheduled to begin this spring on the proposed drain ditch which will extend south and west of the Siding Two beet dump, Montana. The following beet growing farms will be benefited by this drain: W. L.

Pat McLoughlin, known to feeders throughout Western Nebraska and Eastern Colorado, is again topping the market with cattle coming from his Merino, Colorado, feedlots.

Many growers near the dry land area will be interested in watching the feeding results obtained by Gideon Larson, Scoville dump beet grower and feeder, on his lambs this season in the Mitchell district. Mr. Larson is feeding a ration of beet tops and Atlas Sorgho fodder with grain. The Atlas grown on dry land yields higher and the fodder is more palatable than corn, he stated. The fodder and tops are cut by an ensilage cutter. Chopping the tops reduces to a minimum the danger of lambs choking, according to Mr. Larson.

Bernard Huwa at Johnstown dump started farming in 1938 on a 160-acre farm owned by J. W. Whowell. All of his crops made a good yield along with 35.47 acres of beets that made 18.39 tons per acre with a 16.1 sugar per cent. This is a good start for a young farmer who will keep it up.

Sterling is the home of a catalo steer. There are only two others in the United States. He is owned by the Sterling Sales & Commission Company.

Christ Burgart and wife of Pompeys Pillar, Montana, are spending the winter in Long Beach, California.

Henry DeCock, son of Joe DeCock of the Myers district, Montana, left for Chicago January 6, with two car loads of fat lambs. This is the first year that Henry and his father have fed sheep.

Philip Hart recently built a fine new barn on his farm five miles west of Billings.

Andrew Miller, Giddings station, Fort Collins, fought cut-worms and weeds to finish the 1938 season with a 15.64 tons per acre average on 20 acres of beets. The average on the farm for the four previous years was 7.90 tons. Mr. Miller and his family did all the work on the crop.

A. Henry Reifschneider, tenant farmer on one of the Ferguson and Company farms for the past twenty years, recently purchased the Cy Williams farm located two miles north and one mile east of Bayard.

John Long, Hartman station, Lyman, purchased an 80-acre farm last fall just north of the Hartman dump. He has started building a new house, barn, garage, and granary on the place.

Jacob Weinmeister, Stegall station, Lyman, harvested 20.36 tons of beets per acre on 87.51 acres this past season. This was accomplished even though two severe hail storms accompanied by heavy washing rains and one bad washing rain without hail covered his entire contract.

Jacob P. Schlagel is moving from the Benjamin Bros. farm north of Longmont to the Emma Nickell farm.

William Zarbock recently purchased a farm under the Riverside in the Twin Silo community, north of Fort Morgan.

Prime turkeys sold on both the Thanksgiving and Christmas markets, helped the farm incomes for Mr. and Mrs. Jake Mill, Klisner station, Fort Collins. "Turkeys help to keep the grasshoppers from damaging the beet crop," says Mrs. Mill.

Jake Bott, who farmed his father's place west of Billings for several
years, is moving to a farm near Custer.

Carl Kramer, Lyman district, who purchased the Earl Hollenbeck farm, will farm it along with the Amsden place where he now lives.

Carl Knudsen of Sterling is building a two-car garage to add to his set of modern buildings.

Several wells have been drilled in the Sidney Draw which extends southwest from Sidney, Nebraska. Indications are that there is a good water supply under this fertile land which is well adapted for irrigation.

Fred Attebery, cattle feeder and beet grower of Mitchell, states that he has purchased 19 stacks of straw this winter to be used as bedding in his cattle feeding yard in addition to a large stack of his own.

Fred F. Wiest at Johnstown dump, who is farming the Dr. C. W. Bixler place, is proud of the new silo barn and granary that the Doctor has built on the place.

W. A. Allison and J. H. Mayborn, growers west of Billings, were in a car crash which involved four cars. This took place on the Billings-Laurel highway. Mr. Mayborn's daughter, Mrs. Ray Carlson, was injured most seriously and is convalescing at her parents' home.

Henry and Rudolph Schlotthauer, Fort Collins, have built a beet loading machine for loading beets from the pile row into the truck. They hope to perfect their invention before the next harvest, and load all their crop with it.

J. L. Lippincott, of Lyman, whose average tonnage in 1937 was 20.50 tons per acre on 120 acres nearly duplicated that yield with 20.44 average on 138 acres in 1938.

Henry H. Schwindt of Bayard believes in owning a home of his own. This month he purchased the C. O. Morrison farm three miles north and one mile west of Bayard.

Mr. and Mrs. C. W. Kreager, of Crook, Colorado, left January 7th on a trip through Central and South American countries. Mr. Kreager is a prominent merchant and landowner at Crook.

Nick Schlupp, Sr., one of the oldest growers in the Longmont Factory district, passed away at his farm home south and east of town the last of December.

Walter Kindsfater who operates a fine farm near Hesper, was married to Thelma Bakken of Billings on January 7.

J. K. Butcher, Stegall station, Lyman, has purchased the Downer eighty adjoining his home place on the south. This new farm increases his acreage to 400 acres.

The Gering community lost one of its most valued citizens in the recent death of E. P. Cromer. He was a pioneer public servant, farmer and stockman.

A lot of credit will have to be given to William B. Frank in building up a run-down farm in the Loveland district. Mr. Frank is the proud owner of a good sized farm two miles north of the factory. This place had been neglected for years and tenants never stayed longer than they had to, with beet tonnages on the lowest level in the district. Good farming practices brought this farm up to 16.16 tons per acre the first year on 23 acres.

Jack Reichert, of Lyman, feels good over his yield of 20.90 average on 63 acres in 1938.

Alex Popp, oldest son of Jacob Popp, was recently married to Bertha Deines. They will live on the farm
west of Billings heretofore operated by Alex Popp and his father.

Alec Baird, tenant on the Hanna Estate land for a number of years, recently purchased the L. W. Bickel farm in the South Bayard district and has just completed a new barn, granary and house remodeling.

John Sittner, an Ovid grower, has placed 92 head of high grade white face steers in his feed yards. This is the third bunch in his yards within the past year.

Ray Randleman of Fort Collins is hauling manure from sheep camps located 10 to 15 miles north of his farm at Buckeye. Ray plans to transfer approximately 450 tons of sheep manure to his farm to be spread on his beet land for the 1939 crop.

Many Fort Morgan folks declared last fall that Angelo Covelli at Narrows had the best lambs in the valley. He has been living up to this opinion by recently topping the Chicago market.

Henry Marker, Scottsbluff district, has purchased the A. J. August 160-acre farm. Mr. Marker grows a comparatively large acreage of beets each year.

Walter Fenlon recently sold his farm near Worden to Jacob Kautz. Mr. Fenlon has moved to Billings.

Former Representative James Jensen has taken up residence in Berthoud. Mr. Jensen’s farm has been sold to C. E. Van Meter and will be occupied by Leonard Anderson, one of the progressive tenant farmers in the Loveland district.

Joe Paloucek, a new grower in the Ogallala district, not only found beets a good crop to grow, but also made a substantial income from turkeys. He trucked two shipments of birds to the Chicago market for Thanksgiving and Christmas and while there visited several days with relatives.

Milo Meyers, Longmont Factory grower, is spending a couple of months in California.

Doris Coombs, 11-year-old daughter of Mr. and Mrs. E. L. Coombs, who live 4 miles west of Laurel, died January 6, following an emergency operation in a local hospital. She had been a leader in school and 4-H Club work, and her loss will be mourned by the whole community.

Ralph Morrison, prominent Gering beet grower and stockman, was injured several weeks ago in a car accident. He is recovering at his home.

John Blum is finishing his new house on a farm which he bought last summer four miles north of Loveland on the Denver highway. This farm has been considered a low-yield farm and has been without beets for years. Mr. Blum is starting out with the intention of building up this place. The first beet crop raised for years was in 1938 and yielded 16.76 tons per acre.

C. F. Parker, a Sedgwick county cattle grower, has sold several small bunches of steers to farmer feeders.Geo. Weisgerber, Sedgwick, Henry Hein, Sedgwick, John Sittner, Ovid, Jacob Haspert, Ovid, and Jake Heil, Sedgwick, are among the purchasers.

Albert and Fred Ackerman of Fort Collins made a metal cab for their caterpillar tractor this winter. With the yellow paint on the cab and tractor, it has the earmarks of the “stream-lined” models you read about in the papers. The boys join together in saying “Now, we can buck the bugs at Buckeye!”

Jacob Hartwig, of Lyman, rented the C. F. Weidner farm in 1938 which was badly run down—mostly grown
to weeds—and on 38.67 acres produced an average tonnage of 18.19 tons with an average sugar per cent of 17.6. A good farmer on a good farm.

Helen Monforton of Gallatin Gateway, Montana, and Arthur Jacobson of Clyde Park, two of three stock exhibitors sent to Chicago by the first annual junior regional fat stock show held at Billings, captured blue ribbons in the 1938 International Livestock exposition.

C. A. Macy, who had 44 acres of beets that averaged 22.20 tons per acre, at the Longmont Factory station in 1938, is making extensive improvements on his farm north of Longmont and expects to move his family to the new place in the near future.

Fred Vogel, of Factory district, Bayard, is feeding 374 head of cattle for Alex Healy, Jr., of Worland, Wyoming, on the A. M. Ginn farm. In addition to providing a cash market for surplus feeds produced on the farm, the cattle are furnishing an abundance of fertilizer for the coming season and winter employment for Mr. Vogel.

Elmer Slafter moved to Oregon last summer but returned to buy a good farm directly across from the Costin dump in Gering territory.

The Colorado Portland Cement company’s farm at old Namaqua, Loveland district, is showing the results of new paint and new roof on the dwelling, the work of Peter Sauer who has lived there four years. It is on this farm that the old Fort and Stage station of Mariana Modena, almost the earliest white settler in the upper Big Thompson valley, is located. The old stage barn is still used by Mr. Sauer.

E. D. Seldin, who purchased a part of one of the W. C. Harris farms, Sterling, has completed building a set of modern yards and at present has over 500 head of steers and heifers on feed.

The Valley View club of Scottsbluff met Tuesday, January 3, 1939, celebrating the spring and summer birthdays of its members. They entertained with a theater party, then later a tea at the Western Public Service room. Mrs. H. E. Blackburn, Mrs. Glen Blackburn and Mrs. A. R. Wingo were three of the hostesses. There were twenty-three members and three visitors present.

Fred Krumdick of Fort Collins recently threshed his alfalfa. The seed is firm and free of weed seeds. Fred and other farmers of the Waverly community will be able to utilize this seed next year.

Joe Eisenman of Park City, Montana, placed third in the nation and first in the western states in the meat animal live stock contest. He received a trip to the club congress and a $100 college scholarship. Joe is a son of John Eisenman, prominent beet grower and for a number of years on the local board of directors of the Beet Growers Association.

Edgar Dorn of the Sterling district, is wearing a smile these days as a new barn has been built on the farm he has farmed for the past four years.

L. E. Gard will farm his place east of Loveland this coming year. Philip Frank who has farmed on the Gard Estate for several years will continue to operate that part of the place owned by Mr. Gard’s sister, Mrs. Olive Hayes. This large place, owned now by William H. and L. E. Gard and Mrs. Hayes, was originally homesteaded by their father and has been
held intact until its recent division by the heirs. The original patent to the land bears the signature of President U. S. Grant.

Mrs. Josephine Westerdoll, long a resident of Larimer county, and mother of O. F. Westerdoll of Fort Collins district, recently passed away at her home in Loveland. Mrs. Westerdoll and husband homesteaded south of Timnath many years ago.

Adam Ross of Gering valley has just finished installing an electric water system and remodeling his farm home, making it completely modern.

Roger Paulman and Andrew Meyers, of the Sarben, Nebraska, district, came through with an average yield of 15.76 tons on 81 acres of beets. They are now feeding 60 head of fancy Hereford steers, and will have ample fertilizer for another good yield of beets the coming year. These boys are aiming for the “High-Ten” class in production for 1939.

Hamil Brothers, Dave and Don, who raised 153.77 acres of beets averaging 16.81 tons per acre on their two farms in the Sterling district, have been feeding 760 head of high quality steers and heifers during the present feeding season. Dave is now in the state legislature serving as Representative from Logan county. In the meantime Don is supervising their farming and livestock interests at home.

Alex Watson, Harmony station, Fort Collins, favors grinding beet tops as roughage for lambs. He says it makes excellent feed, is less trouble to feed, and has no bad effects on the lambs.

Peter Van Hemelryck and family of Neiler, Montana, spent a month during the winter visiting on the West coast.

On the F. A. Carmony farm near Edgar, Montana, 940 lambs are making over one-half pound daily gain per head on a ration consisting of one-half oats, one-half dried molasses beet pulp (self-fed), and hay.

Philip Nagel recently purchased one of the First Trust Company’s farms in the Perrin area, Bayard district, and expects to take possession and start improving his farm immediately, about February 1. Mr. Nagel has an unbroken record of high beet yields during the past few years.

That live stock feeding is definitely on the upgrade in the Bridger, Montana, district was demonstrated on January 7, when fifty farmers attended the first Carbon county live stock tour and viewed the feeding methods of eleven farmers. Over 12,700 sheep and 815 cattle were fed on these farms. The tour was arranged by O. P. Roberts, county agent in Carbon county.

Work was started the latter part of December on the new $80,000.00 high school building at Worden, Montana. The building will be completed for the 1939 term. The present high school plant will be used for the Junior High.

The entire Bridger, Montana, community was grieved to learn of the death of Pete Delmonica, prominent grower and stockman of the Overstreet district, January 9.

Mary Ungefug, daughter of Carl Ungefug of the Belfry district, Montana, was recently married to E. McCluskey of Bear Creek.

Fred Heist of Iliff has built a new beet laborer’s house on his recently purchased farm.

Two sons of Gottfried Oblander of Ballantine, Montana, recently went to Detroit and drove back two new automobiles which were delivered to Mr.
Oblander direct from the factory.

The new gymnasium at Joliet, Montana, was recently completed. The construction of the gymnasium at Hysham is being rushed and should be finished before the last of January.

Hugh Scilley and Don Foote have built an addition to the beet house on their farm operated by Ray Amen in the Loveland district. Mike Remijio, the beet worker on the place, feels that this is partial remuneration for helping Mr. Amen produce a better than 20-ton crop this past year.

J. L. Brown, prominent beet grower and feeder at Brule, Nebraska, was one of the successful Republican candidates for county commissioner of Keith county.

J. F. (Pat) King, Joyce station, Lyman, was elected president of the Nebraska Non-Stock Beet Growers Association at their annual election in December.

E. A. Andrews, manager of the Iliff Hardware, reports a larger demand this year for panels and feed bunks, due to the increased sheep feeding in the Iliff-Proctor district.

Congratulations to Mr. and Mrs. Fred Achziger of Wellington who are the proud parents of twin boys!

“Bill” Wilder and Frank Mercer, Big Springs, Nebraska, both farming places owned by Theodore Reimers of Grand Island, Nebraska, ran a very close race on average tonnage this year. Mr. Wilder harvested 18.37 tons per acre on 66.57 acres, while Mr. Mercer harvested 18.38 tons on 39.44 acres.

Carl Ahlbrandt and Henry Bender of Dixon, Fort Collins district, are feeding two cars of cattle in order to maintain the fertility of their soil.

Mr. and Mrs. Conrad Bauer, Jr., Ovid district, have a new daughter, Joanne. Mr. Bauer, one of the youngest growers in the East Factory district, has recently built a new corral this fall and is feeding calves. He is to be commended on the work done in improving his place this past year.

J. B. Johnson, a long time resident of Fort Collins, passed away recently. He was the father of Harvey Johnson, Ed Johnson and Wesley Johnson of Fort Collins, and Elmer Johnson of Eaton, all prominent farmers in their respective localities.

Richard Ireland, son of Mr. and Mrs. R. M. Ireland, of Hudson, is attending Colorado University this year.

Giving an animal DRIED BEET PULP is like bringing summer pastures into the winter barn or feed lot.

DRIED PULP is succulent, bulky, appetizing!

When you replace part of the grain with DRIED PULP you find that the WHOLE RATION works BETTER and more ECONOMICALLY!
# Table of Contents

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harvests 14-Ton Crop from Field “Ruined” by Hail!</td>
<td>2</td>
</tr>
<tr>
<td>Water Outlook Favors High Beet Yields</td>
<td>3</td>
</tr>
<tr>
<td>Increasing Profits Through By-Products—E. J. Maynard</td>
<td>4</td>
</tr>
<tr>
<td>Loss of Stand in Sugar Beets—Asa C. Maxson</td>
<td>6</td>
</tr>
<tr>
<td>Soil Fertility and Animal Nutrition—Dr. Charles H. Kick</td>
<td>8</td>
</tr>
<tr>
<td>A New Approach Toward Worm Control in Feeder Lambs—Dr. N. J. Miller</td>
<td>11</td>
</tr>
<tr>
<td>1938 Honor Roll of High-Tonnage Growers</td>
<td>14</td>
</tr>
<tr>
<td>Progressive Farmers at Fort Morgan</td>
<td>22</td>
</tr>
<tr>
<td>Some of Minatare’s 20-Ton Growers!</td>
<td>25</td>
</tr>
<tr>
<td>Around the Territory</td>
<td>28</td>
</tr>
</tbody>
</table>

The Great Western Sugar Co., Longmont, Colorado
SAVE TIME BY TAKING TIME TO DO IT RIGHT!

In a late wet spring, like the present one, some growers may be inclined to hurry their seed bed preparation too fast in order to get their beet crop in. But REMEMBER that the advantages of early planting are lost if the seed bed is full of clods and air pockets. Take plenty of time to work your seed bed down to a firmly packed garden-like condition!

MARCH, 1939

THE GREAT WESTERN SUGAR CO.
Don't Be Late for the Train!

By DR. H. E. BREWBAKER

IN THIS issue I have asked the editor to reprint a cartoon which appeared in the March, 1936, issue of Through The Leaves. Here you see a cartoonist's version of late plowing and seed bed preparation delaying planting, blocking, thinning and irrigation to such an extent that the "High-Tonnage Special" pulled out and left behind all who were too late. Again in that issue was another picture of two farmers watching a rain cloud on April 15. One farmer says: "This rain is wonderful, my beets are all planted." The other farmer says: "I wish it would stop so I could finish plowing."

If we want to catch the "High-Tonnage Special" we've got to be at the station on time, because the train won't wait. And if we want spring rain to help us rather than set us back, we've got to keep ahead of the game by having our seed beds prepared early.

EARLY planting is a prerequisite of high yields. Four years results by the U. S. department of agriculture at Fort Collins showed a loss of 2-3 tons with a delay of 2 weeks in planting after the 13th of April, 2 tons loss for a delay of 4 weeks, and 4 tons loss with a delay of 6 weeks. Earliness of planting can be obtained only by making the most of every opportunity for seed bed preparation.

What Constitutes a Good Seed Bed?

In general, a small seed such as alfalfa, sweet clover, or grasses require a more finely pulverized and well-packed seed bed than is necessary for larger seeds such as corn, beans or peas. In commercial beet seed there is a wide variation in size of "seed ball," the seed or germ itself being comparable in size to a turnip or radish seed. There may be anywhere from 1 to 5 or 6 seeds or germs, each in a separate pocket, in the seed ball, the average being between 1 and 2. Because of the relatively large corky nature of the seed ball, sufficient moisture is required to wet both the corky tissue and the seed or germ before germination can take place. A finely pulverized, well-packed seed bed is, therefore, essential if the soil par-
articles are to be in sufficiently close contact with the seed ball to supply the needed moisture.

Furthermore, the sub-surface must be well-packed, and free from air pockets.

How Obtained?

No Blanket rule can be given, but certain general principles apply:

1. Fall or early spring plowing is generally superior to later spring plowing. A double disking just preceding plowing is a great help in preventing a loose subsurface, full of air pockets—this is especially necessary with stubble, manured, or weedy land, and with spring plowing. Fortunate is the grower who has his land fall plowed. Harrow once or twice, followed by a leveling operation, and he is ready to plant with all of the winter accumulation of moisture retained for early growth.

2. Work down immediately regardless of time of year. A single section of a harrow attached to the plow is extremely useful in smoothing down the surface immediately, thereby slowing up loss of moisture by evaporation, and preventing the formation of clods. Following this, a disk set straight, or preferably a Campbell packer weighted down well, are excellent in packing the subsurface and breaking up clods. A fair substitute for the Campbell packer can be made by cutting off the flanges of each roller on an old corrugated type roller.

On very sandy land, fall plowing is probably impractical because of blowing. On such land the subsurface should be well-packed, but the surface should not be worked down to the point where it is likely to blow.

3. Leveling with some form of float or land leveler is essential in seed bed preparation. This is, of course, common practice among sugar beet growers, but there is much room for improvement in this connection. A thorough job of leveling with effective equipment is very important.

Finally, timely and thorough preparation has no substitute, and no amount of care later can make up for neglect in this most fundamental of all cultural operations. A good thinned stand depends upon a good seed bed, all of which is prerequisite to a free ride on the "High Tonnage Special."

Henry Gantz, formerly of Bayard, has purchased the H. H. Egbert 80-acre farm in the Minatare district.

E. E. Hill, prominent land owner at Minatare, is planning a trip to the World's Fair in New York in June.

Joe Kuchinski of the Golden district, Montana, has recently sold 200 head of his high quality yearling Hereford calves. He received a premium of four dollars per head because of the exceptional quality of the calves.
Without the beet sugar industry, fully 16,000 people now living in the North Platte Valley would have to seek a livelihood elsewhere, resulting in proportionate decline in the business activity now typified by this view of the business district of Scottsbluff.

Sugar Beets Mean Solvent Agriculture on Western Irrigated Lands

The sugar beet crop "is the one crop grown in the temperate zone of the United States that makes possible the solvency of Western irrigated agriculture," according to a paper presented before the American Society of Sugar Beet Technologists, by D. J. Roach, Nebraska district manager of The Great Western Sugar Company, at Fort Collins, February 8.

Mr. Roach described how pioneer irrigation developed from simple diversion of water to nearby bottom lands along the streams to complicated and expensive systems involving reservoirs and ditches serving large bench-land areas. In most instances, the water supply question was now solved, but every acre of land was burdened with a further capital charge, the interest and amortization of which must be earned.

The North Platte Project, he said, was typical of most of the irrigation development of the last forty years involving ditch-and-reservoir systems. On this project the Reclamation Bureau has spent more than $25,000,000 to irrigate approximately 200,000 acres of land, and for provision of supplemental storage water for 100,000 additional acres privately operated.

Naturally, these complicated systems are expensive to maintain and operate, and these expenses on such a system may range from $1 to $2 per acre per year, he pointed out. To meet these capital and oper-
ation charges the irrigation farmer soon faced the problem of finding a crop of high acre return and reasonable surety that would allow him to meet the extra charges that are inherent to irrigated agriculture.

"The standard crops will not do the job, and through a process of trial and error the sugar beet crop has been found to be the one crop grown in the temperate zone of the United States that makes possible the solvency of Western Irrigated Agriculture."

Mr. Roach's remarks brought out the following information:

Each year the United States Bureau of Reclamation determines the gross returns from the crops grown on the North Platte Project. The following is a summary of this information for the past five-year period:

<table>
<thead>
<tr>
<th>Gross Return Per Acre</th>
<th>Rent Return Per Acre</th>
<th>% of Total Acreage</th>
<th>% of Total Gross Return</th>
<th>% of Total Rent Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>$81.11</td>
<td>$20.26</td>
<td>21.5%</td>
<td>52.2%</td>
<td>46.2%</td>
</tr>
<tr>
<td>$20.25</td>
<td>6.46</td>
<td>78.5%</td>
<td>47.8%</td>
<td>53.8%</td>
</tr>
</tbody>
</table>

You will note that on this project 21.5 per cent of the total irrigated land was devoted to growing sugar beets, and yet that crop produced 52.2% of the gross farm revenue.

From a landowner's standpoint, this 21.5 per cent on which sugar beets were grown made up 46.2 per cent of the total rent return from which the overhead costs of irrigated agriculture could be paid. When one studies a situation such as this, it would not seem to be an accident that the sugar beet crop has become so important to Western Irrigated Agriculture.

THERE is, moreover, another part to this industry, and that is its community phase. Not only does the sugar beet crop make for a greater farm income, but in the factory payroll, the taxes paid, the freight bills, and in many other items, the industry makes expenditures that contribute to the business prosperity of the many communities in which it operates.

Again referring to the Nebraska area, it is estimated that for every acre of sugar beets grown in the North Platte valley, the business of that community is increased by factory payrolls, local taxes paid by the Sugar Company, freight payments on outgoing and ingoing freight, and miscellaneous local purchases an amount equal to $52 per acre of sugar beets harvested.

If the gross return to the farmer from an acre of sugar beets is $50 more than the return would be if that acre of ground were devoted to a standard crop (and the results in the Table show this difference to be more than $60), and if the other expenditures in the community and state by the industry are $30 per acre, then the business of a beet community is greater by $80 per acre of sugar beets than if there were no such industry or if it were discontinued. Assuming a beet acreage of 60,000, then the beet industry increases the yearly business income of the Nebraska area $4,800,000; and on the basis of a family income of $1500 and five to the family, that industry furnishes the support for 16,000 people who, if the industry were discontinued, would need to find
a livelihood some place else. The sugar beet industry means the actual existence of many western communities as we now know them.

MORE can be said about the feeding industry that follows the growing of sugar beets. Careful calculations indicate that the by-products from an acre of sugar beets will produce at least 300 pounds of beef or mutton, probably an additional value of from $18 to $24 per acre in community wealth. In fact, these by-products have an equivalent feed value per acre not far below the feed value of a 2.5 ton crop of alfalfa or a 40-bushel crop of corn, and fully justify the slogan "Two Crops in One."

"I think it can safely be said," Mr. Roach concluded, "that the sugar beet crop produces more human food per acre than any other crop grown in the temperate zone."

Farmers May Be Paid to Plant Shelterbelts

Farmers may now establish a complete protective shelterbelt of trees around their farms and be paid to do it, according to R. E. Ford, forester for the Colorado State College Extension Service at Fort Collins.

The AAA recognizes the importance of trees on every farm and sets the highest credit in the farm program for establishing tree plantings, he adds. Details of the AAA program regarding tree planting may be obtained by interested farmers from their local county extension agents and county agricultural conservation committees.

Mr. Ford is author of an interesting article on beautifying the farm, on page 60 of this issue.
17.77 Minus 8.72 Equals 9.05!

To Prove or Disprove

whether his land needed phosphate, Joe J. Kloberdanz of Sterling applied 125 pounds of superphosphate per acre to his beet land, but left a strip without phosphate diagonally across the beet rows. Here is how the beets looked June 23, 1938, over three weeks after thinning.

When Joe Walked

through his field in June, there was no doubt in his mind that phosphate had helped early growth, but he wondered what the harvest would bring.

He Knew the Answer

on the last day of October, 1938. Joe stands in the foreground by a pile of phosphated beets that yielded at the rate of 17.77 tons per acre. Felix Kloberdanz stands behind him with the unphosphated beets that averaged 8.72 tons per acre. The difference was 9.05 tons per acre in favor of phosphate. If your land needs phosphate, nothing will take its place.
The Manure-Live Stock Feed Relationship of Different Types of Manured Rotations

By LIONEL HARRIS
Assistant Agronomist, Scottsbluff Field Station, U. S. D. A.

There are five rotation comparisons at the Scottsbluff field station which have been devoted to a study of the value of farm manure in irrigation farming. Each manured rotation has been compared directly with a rotation that has not received manure. The study was inaugurated in 1911, and has been continued without interruption to the present time. Included in the study are three types of manured rotations, represented by three 2-year rotations, one 3-year rotation, and one 6-year rotation.

It has been shown in this work that manure has exerted a stimulating influence on the yields of irrigated crops. In the five comparisons manure has increased the yield of sugar beets 6.5 tons per acre, oats 14.5 bushels per acre, potatoes 68 bushels per acre, and alfalfa .4 tons per acre over a 25-year period. From these increased yields the mean value of a ton of farm manure has been calculated to be $3.72 per ton. The high value indicated for manure should induce farmers to give consideration to the production and conservation of manure on their farms.

Farm manure is an important substance contributing to the maintenance of the productivity of irrigated soil. Live stock feed is essential in the production of farm manure, consequently in planning a cropping program for an irrigated farm, it is important to give consideration to the production of sufficient live stock feed for converting into an adequate quantity of manure for the operation of the program.

The present paper deals with the manure-live stock feed relationship of three types of manured rotations at the Scottsbluff field station. It has the following objectives:

1. To indicate the manure produced by a ton of live stock feed.

2. To show the quantity of live stock feed available in various types of manured rotations.

3. To indicate the possible manure production in various rotations upon
the basis of feed grown, as compared with the manure necessary to operate the rotations.

**Description of the Rotations**

The five manured rotations at the Scottsbluff field station are numbered as follows: 21, 23, 25, 31, and 61. Rotation 21 is a 2-year rotation of sugar beets and potatoes with manure applied to the potato crop annually at the rate of 12 tons per acre. Rotation 23 is a 2-year rotation of oats and sugar beets, with an annual application of manure to the sugar beet crop. Rotation 25 is a 2-year rotation of oats and potatoes, with manure applied to the potato crop. Rotation 31 is a 3-year rotation of potatoes, oats, and sugar beets, with manure applied to the sugar beet crop. Rotation 61 is a 6-year rotation of alfalfa (3 years), potatoes, oats, and sugar beets, with manure applied to the sugar beet crop.

**Manure Available From a Ton of Live Stock Feed**

The amount of recoverable manure which may be obtained from various animals varies to a large degree. Factors affecting the amount of recoverable manure which may be obtained from various animals include the kind and amount of ration fed, the kind and amount of bedding used, the nature of the floor upon which the manure accumulates, and the economic function of the animal. However, from data available regarding manure recovered from a given number of animals, and the food consumed by the animals during the manure recovery period, it is possible to arrive at approximate figures indicating the manure recoverable from a given quantity of feed consumed by animals.

Data regarding this subject are available from experiments conducted at Ohio and New York, and are tabulated in table 1. The experiments conducted...

**Table 1. Ratio of Live Stock Feed to Manure Produced.**

<table>
<thead>
<tr>
<th>No. Animals</th>
<th>Length of Exp.</th>
<th>Feed Consumed</th>
<th>Manure Recovered</th>
<th>Per Cent Bedding</th>
<th>Per Cent Moisture in Manure</th>
<th>Ratio of Feed to Manure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dairy Cattle</td>
<td>1... 6</td>
<td>10</td>
<td>1.15</td>
<td>1.85</td>
<td>6.5</td>
<td>1-1.61</td>
</tr>
<tr>
<td>Dairy Cattle</td>
<td>*2... 71</td>
<td>1</td>
<td>2.48</td>
<td>3.27</td>
<td>9.4</td>
<td>75.2</td>
</tr>
<tr>
<td>Feeder Cattle</td>
<td>1... 48</td>
<td>390</td>
<td>223.3</td>
<td>349.8</td>
<td>15.4</td>
<td>78.8</td>
</tr>
<tr>
<td>Feeder Cattle</td>
<td>1... 30</td>
<td>182</td>
<td>81.8</td>
<td>115.8†</td>
<td>16.7†</td>
<td>78.8</td>
</tr>
<tr>
<td>Feeder Sheep</td>
<td>1...160</td>
<td>112</td>
<td>24.4</td>
<td>24.9</td>
<td>10.0</td>
<td>63.1</td>
</tr>
<tr>
<td>Hogs ‡</td>
<td>2... 9</td>
<td>7</td>
<td>.31</td>
<td>.45</td>
<td>12.0</td>
<td>74.1</td>
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<table>
<thead>
<tr>
<th>Mean</th>
<th></th>
<th></th>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Total of four experiments.
† Exclusive of floats.
‡ Total of three experiments.

ducted at Ohio with feeder cattle and feeder sheep involve enough animals, and cover a sufficiently long period of time to make the results fairly representative of manure recovery conditions. These experiments also deal with animals constituting the major classes of live stock in the North Platte valley at the present time.

The data in table 1 regarding feed consumed and manure produced by dairy cattle and hogs may be less representative of manure recovery conditions from these animals in the North Platte valley, because the data presented deal chiefly with comparatively fresh manure. In the experiments with feeder cattle and feeder sheep, the manure was collected and weighed after it had accumulated for a period of several weeks, while with dairy cattle and hogs, the manure was collected after a few days accumulation.

The moisture content of feed consumed has a bearing on the live stock feed-manure ratio. For example, the extensive use of wet beet pulp in a ration would result in a narrower live stock feed-manure ratio, than the use of common dry feeds. The rations fed to animals in the experiment reported in table 1, may be considered fairly representative of rations fed these animals in the North Platte valley. The rations fed dairy cattle in the experiments reported in table 1, consisted chiefly of bran, silage, stover, roots, and hay. The rations fed feeder cattle consisted of grain, concentrates, silage, dried beet pulp, and hay. The rations fed sheep consisted of corn, cottonseed oil meal, linseed oil, and hay. The rations fed hogs consisted of skimmed milk, corn meal, bran, and concentrates.

In an experiment with dairy cattle at Ohio the manure from six mature dairy cows was collected for a period of ten days (table 1). The total feed consumed by the cows amounted to 1.15 tons, and the manure recovered, 1.85 tons, or a ratio of one ton of feed to 1.61 tons of manure. At New York the manure from 71 cows was collected for a period of one day. The cows consumed 2.43 tons of feed, and produced 3.27 tons of manure, or a ratio of one ton of feed to 1.34 tons of manure. At Ohio, 48 steers fed for a period of 13 months, consumed 223.3 tons of feed and produced 349.8 tons of manure, or a ratio of one ton of feed to 1.57 tons of manure.

In another test at Ohio involving 30 steers for a period of 182 days, a ratio of one ton of feed to 1.41 tons of manure was obtained. At Ohio 160 feeder lambs were fed for a period of 112 days. During this time the lambs consumed 24.4 tons of feed, and produced 24.9 tons of manure, or a ratio of one ton of feed to 1.02 tons of manure. Nine hogs fed for a period of seven days consumed .31 tons of feed and produced .45 tons of manure, or a ratio of one ton of feed to 1.45 tons of manure. In this test 12 per cent has been added to the excrement obtained at New York to account for bedding.

In the per cent moisture column in table 1 it should be noted that the sheep manure is notably drier than the manure from the other classes of live stock. On a dry matter basis sheep produced .37 tons of manure for each ton of feed consumed, as compared with .33 tons for dairy cattle and feeder cattle, and .37 tons for hogs. In the experiments with dairy cattle the bedding used was believed to be too low to be representative of conditions in the North Platte valley.
THE mean live stock feed-manure ratio obtained from the data presented in Table 1 was one ton of feed to 1.40 tons of manure. It is believed that this ratio may be used as a fair approximation for manure obtainable from a given quantity of live stock feed in the North Platte valley, when in using the data consideration is given to the many factors influencing the production of recoverable manure, including the moisture content of feeds used in the ration, moisture content of manure, kind and amount of bedding used, and the economic function of the animal.

**Live Stock Feed Produced in Various Rotations On An 80-Acre Basis**

In Table 2 are presented data based upon the 26-year mean yield of crops, indicating the amount of live stock feed available from various manured cropping programs on an 80-acre basis. The live stock feeds available in these rotations include beet tops, oats, and alfalfa. In determining the yield of beet tops it has been considered that for each ton of beets produced there may be obtained 275 pounds of dried tops.

On an 80-acre basis each crop in a 2-year rotation occupies 40 acres of ground, in a 3-year rotation, 26⅔ acres, and in a 6-year rotation, each crop occupies 13⅓ acres annually. The total live stock feed produced in the various rotations on an 80-acre basis amounts to 92 tons for rotation 21, 138 tons for rotation 23, 37 tons for rotation 25, 92 tons for rotation 31, and 199 tons for rotation 61.

**Table 2. Live Stock Feed Produced in Various Rotations on an 80-Acre Basis**

<table>
<thead>
<tr>
<th>Rotation*</th>
<th>26 Year Mean Yield</th>
<th>Beet Tops†</th>
<th>Oats</th>
<th>Alfalfa</th>
<th>Total Livestock Feed Produced Tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>21—Beets</td>
<td>16.8</td>
<td>92</td>
<td></td>
<td></td>
<td>92</td>
</tr>
<tr>
<td>Potatoes</td>
<td>238.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23—Oats</td>
<td>60.6</td>
<td>39</td>
<td></td>
<td></td>
<td>138</td>
</tr>
<tr>
<td>Beets</td>
<td>18.0</td>
<td>99</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25—Potatoes</td>
<td>240.7</td>
<td></td>
<td></td>
<td></td>
<td>37</td>
</tr>
<tr>
<td>Oats</td>
<td>57.6</td>
<td>37</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31—Potatoes</td>
<td>254.8</td>
<td></td>
<td></td>
<td></td>
<td>92</td>
</tr>
<tr>
<td>Oats</td>
<td>64.1</td>
<td>27</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beets</td>
<td>17.7</td>
<td>65</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>61—Potatoes</td>
<td>311.2</td>
<td></td>
<td></td>
<td></td>
<td>199</td>
</tr>
<tr>
<td>Oats</td>
<td>72.5</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beets</td>
<td>18.7</td>
<td>34</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alfalfa</td>
<td>1.0</td>
<td></td>
<td></td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Alfalfa</td>
<td>4.8</td>
<td></td>
<td></td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>Alfalfa</td>
<td>5.5</td>
<td></td>
<td></td>
<td>73</td>
<td></td>
</tr>
</tbody>
</table>

* Manure has been applied annually at the rate of 12 tons per acre to the potato crop in rotations 21 and 25, and to the beet crop in rotations 23, 31, and 61.

† 275 pounds dry substance of tops per ton of beets.
Possible Manure Production From the Feeds Grown in the Manured Rotations

In Table 1 the calculated manure produced by a ton of live stock feed amounted to 1.40 tons. Using this figure together with the live stock feed produced in the manured rotations it is possible to determine the approximate amount of manure which may be produced from the feed grown in each rotation. Data indicating this information are presented in Table 3.

### Table 3. Possible Manure Production from Live Stock Feed Produced in Various Manured Rotations on an 80-Acre Basis*

<table>
<thead>
<tr>
<th>Rotation</th>
<th>Livestock Feed Grown</th>
<th>Possible Manure Production</th>
<th>Required Manure</th>
<th>Additional Manure Necessary</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tons</td>
<td>Tons Per Acre</td>
<td>Tons</td>
<td>Tons Per Acre</td>
</tr>
<tr>
<td>21</td>
<td>92</td>
<td>1.6</td>
<td>129</td>
<td>6</td>
</tr>
<tr>
<td>23</td>
<td>138</td>
<td>2.4</td>
<td>193</td>
<td>6</td>
</tr>
<tr>
<td>25</td>
<td>37</td>
<td>0.6</td>
<td>52</td>
<td>6</td>
</tr>
<tr>
<td>31</td>
<td>92</td>
<td>1.6</td>
<td>129</td>
<td>4</td>
</tr>
<tr>
<td>61</td>
<td>199</td>
<td>3.5</td>
<td>279</td>
<td>2</td>
</tr>
</tbody>
</table>

* Calculated from live stock feed—manure ratio of 1-1.40.

On an 80-acre basis, 480 tons of manure are required annually for the operation of a 2-year manured rotation, while the possible manure production on the basis of the feed grown amounts to only 129 tons in rotation 21, 193 tons in rotation 23, and 52 tons in rotation 25. The 3-year rotation requires 320 tons of manure annually for its operation, as compared with 129 tons which may be produced from the feed grown.

In rotation 61, 160 tons of manure are required annually for the operation of the rotation, yet the feed grown may be utilized for the production of 279 tons of manure, or a surplus of 119 tons above the amount required. In the short rotations considerable additional manure is necessary for their operation, above the amount which may be produced from the feed grown.

In the 6-year rotation the data indicate that the live stock feed produced is sufficient to account for considerably more manure than is necessary to operate the rotation. In the short rotations it should be pointed out also that the live stock feeds grown are not of a sufficient variety to feed animals in balanced rations. In view of this it may be difficult to satisfactorily utilize the feeds grown for the maintenance of animals and consequence manure production.

In planning manured cropping programs for irrigated land, farmers should give consideration to the production of manure for the maintenance of the productivity of their soils, and also the production of sufficient live stock feed to maintain the required number of animals. The manured rotations at the Scottsbluff station have yielded information regarding the importance of manure in helping to maintain the productivity of irrigated soils. From data collected at other
stations regarding the production of manure by the various classes of animals, it has been possible to calculate the approximate amount of manure obtainable from a unit of live stock feed.

With these data the manure-live stock feed relationship of various types of manured rotations has been studied. The short manured rotations, requiring a large quantity of manure, failed to produce sufficient live stock feed for their maintenance. The six year rotation, including alfalfa in the cycle of crops, produced more than enough live stock feed. Each farmer on irrigated land should apply a sufficient quantity of manure to his soil each year to maintain the productivity, and as near as possible he should produce enough live stock feed to keep the required number of animals from which manure can be obtained. Data reported in the present paper are important chiefly for aiding farmers in planning balanced, self-supporting, manured cropping programs for their farms.

R. G. Cheairs and a Few of the 8,300 Lambs He Has on Feed This Season

Over 17½ Tons on 340 Acres

The farms owned by R. G. Cheairs, and those under his management for the Cheairs Investment Company, produced a total of 340 acres of sugar beets in 1938 that averaged 17.57 tons per acre. This is almost two tons per acre above the average of the Sterling district. Mr. Cheairs maintains this high productivity on his lands by consistently feeding each year. This season there are 8300 head of lambs on feed in his farm feed lots. In addition to the remarkable production record of these farms, they are also outstanding in the neat appearance of the improvements and the splendid relationship existing between landowner and tenant.
All Hail the Beets

By E. S. WILLIS, Fieldman

DURING the afternoon of June 10, 1938, one of the worst hail storms in recent years pelted the growing crops throughout the north part of the North Sterling territory. The hailed area was approximately four miles wide and extended from north of Buchanan dump to northeast of Proctor. A strip about two miles wide through the center of the storm area was devastated of all foliage; corn that was up was cut off at the ground level and the beet fields were as bare as roads. The small grain that had already headed out was a total loss. Lister rows were more than half filled with hail that came with a very high wind and very little rain until after the hail had passed. As the hail melted, foliage was washed off of the fields and banked up against the fences, damming up the water and making lakes of the fields.

Six days later, June 16, another terrific hail swept over the territory from the east edge of Hall station through the Factory district, Ackerman, Sherwin, and Jessica and out into the dryland to the north.

A total of 2,800 acres of beets was damaged by the two storms and of this total 1,272 acres of beets were completely cut to the ground. The growers faced a very discouraging situation, as all crops were damaged, including alfalfa. Some planted corn or cane in the former grain fields and some of them even thought that the beets were lost.

The accompanying pictures are typical of the damaged farms. They were taken on one of A. A. Smith's farms north of Proctor and all are of the same field at different times. John Hernandez is the tenant on this farm.

The first picture shows clearly the condition of the field immediately following the first storm, June 10.

The second picture was taken August 10, two months later and shows the rapid recovery and splendid growth of the beets.

The third picture was taken during harvest, October 25, and the size of the beets indicates the better-than-normal yield that resulted. This yield was 15.52 tons per acre on the entire contract.

The following is a list of 39 growers within the two storm areas who were selected because their small grain was completely destroyed and whose beet fields were swept bare. Their average yield of 14.65 is one ton less than the Sterling yield for this year, but in most instances considerably better than their normal yield. This again emphasizes the remarkable ability that the sugar beet has to withstand adverse conditions and to make an excellent recovery.

<table>
<thead>
<tr>
<th>Grower</th>
<th>Yield Per A.</th>
</tr>
</thead>
<tbody>
<tr>
<td>John Bianco</td>
<td>21.75</td>
</tr>
<tr>
<td>Ramey Brothers</td>
<td>20.13</td>
</tr>
<tr>
<td>Jno. P. Schell</td>
<td>18.40</td>
</tr>
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</table>
### Grower Per A. Yields

<table>
<thead>
<tr>
<th>Grower</th>
<th>Yield Per A.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toni Dal Ponte</td>
<td>17.81</td>
</tr>
<tr>
<td>F. Guenzi &amp; McRoberts</td>
<td>17.64</td>
</tr>
<tr>
<td>Louie E. Rieke</td>
<td>17.30</td>
</tr>
<tr>
<td>Antonio Cucarolo</td>
<td>16.96</td>
</tr>
<tr>
<td>Henry Debus</td>
<td>16.24</td>
</tr>
<tr>
<td>Anton Steinbach</td>
<td>15.70</td>
</tr>
<tr>
<td>John Hernandez</td>
<td>15.52</td>
</tr>
<tr>
<td>Andrew Hochnadel</td>
<td>15.49</td>
</tr>
<tr>
<td>Fred J. Miller</td>
<td>15.31</td>
</tr>
<tr>
<td>Fred Young</td>
<td>15.22</td>
</tr>
<tr>
<td>R. G. Pyle</td>
<td>15.11</td>
</tr>
<tr>
<td>Sam Dick</td>
<td>15.01</td>
</tr>
<tr>
<td>Jacob Lebsack, Jr.</td>
<td>14.72</td>
</tr>
<tr>
<td>D. R. Pyle</td>
<td>14.63</td>
</tr>
<tr>
<td>Manuel Hernandez</td>
<td>14.30</td>
</tr>
<tr>
<td>Raymond Pyle</td>
<td>14.27</td>
</tr>
<tr>
<td>A. P. Schell</td>
<td>14.27</td>
</tr>
<tr>
<td>Pete Hergenreter</td>
<td>14.07</td>
</tr>
<tr>
<td>John Ils</td>
<td>13.97</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grower</th>
<th>Yield Per A.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C. L. George</td>
<td>13.80</td>
</tr>
<tr>
<td>F. Guenzi &amp; Rosenbaum</td>
<td>13.76</td>
</tr>
<tr>
<td>W. L. McNear</td>
<td>13.64</td>
</tr>
<tr>
<td>A. J. Bartholomew</td>
<td>13.31</td>
</tr>
<tr>
<td>Peter Dies</td>
<td>12.97</td>
</tr>
<tr>
<td>Jake Dick</td>
<td>12.46</td>
</tr>
<tr>
<td>Gabriel Artzer</td>
<td>12.22</td>
</tr>
<tr>
<td>Carl Knutson</td>
<td>12.19</td>
</tr>
<tr>
<td>Ray E. Rieke</td>
<td>11.76</td>
</tr>
<tr>
<td>W. A. Hubbard</td>
<td>11.47</td>
</tr>
<tr>
<td>Joe P. Meier</td>
<td>11.05</td>
</tr>
<tr>
<td>Herman F. Kuskie</td>
<td>10.28</td>
</tr>
<tr>
<td>Sam Ils</td>
<td>9.73</td>
</tr>
<tr>
<td>Paul &amp; Albert Dick</td>
<td>9.60</td>
</tr>
<tr>
<td>Jas. J. Applehans</td>
<td>9.47</td>
</tr>
<tr>
<td>John Huston</td>
<td>8.36</td>
</tr>
<tr>
<td>C. P. Curtis</td>
<td>8.27</td>
</tr>
</tbody>
</table>

Average: 14.65

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### Turkeys Help Produce High Yields

Several Sterling growers on the Haley-Smith farms decided in 1938 to enlist the help of turkeys in controlling grasshoppers. In 1937 these men lost all of the new alfalfa seeding as well as a large share of other crops. The turkeys not only controlled the grasshoppers, but brought to their owners tidy profits on the Thanksgiving and Christmas markets.

Gus E. Sutter grazed 1,100 turkeys over his fields during the growing season. He harvested an average yield of 18.14 tons of beets per acre, as compared with 10.91 tons in 1937. The average yields received from all crops were increased over those realized in the past as a result of the turkeys. He was able to save all of his new alfalfa seeding as well as $35 which was spent for grasshopper poison in 1937.

Fred J. Miller, also "hired" 1,000 young turkeys to solve the grasshopper problem. Their efforts were successful, since Fred harvested 15.31 tons of beets per acre as well as securing a good stand of alfalfa on 28 acres of new seeding in addition to good yields of grain crops. Last year Fred spent $80 for grasshopper poison, purchased a mechanical bait spreader, a hopper dozer, and a pressure weed burner, to control the hoppers. The turkeys, in addition to the grasshoppers, received a balanced supplemental grain feed and graded, at market time, 94 per cent prime quality. Mr. Miller realized a profit of $900 from this flock in addition to increased yields of his farm crops.

—J. E. FACER.
With only experience in the sheet-metal business to guide him, E. A. Simpson took a three-sided approach to farming, combining beet-growing, ranching and stock-feeding. He now gets up to 23 tons of beets per acre and has as fine a balanced system of crops and animals as a person could ask for. In the background is his grain elevator.

He Left Industrial Work to Try Farming

Back in his sheet metal shop in Cortland, Ohio, Mr. E. A. Simpson figured that if a man applied the same efficient management to farming that he did to industrial work, farming would produce about the same results as industry.

Mr. Simpson had had practically no farming experience, but he liked the West and decided to take a crack at western farming. When he came to the Mitchell Valley, Nebraska, in 1930, he heard the usual conflicting opinions that greet a newcomer in a new activity. Some said farming was a losing proposition; some said it was all right if you did it right. He'd heard the same kind of talk in industrial circles. He had a hunch that there wasn't much difference between a farm and an industrial activity; both would fail with bad management; both would succeed with good management.

So he purchased 240 acres of fine land in the Mitchell valley and later on acquired a 7,500 acre stock ranch in the Kiowa country. First class sheep and cattle yards were constructed on the Mitchell farm. Last fall a large barn was converted into a modern grain elevator, which has a 20,000 bushel capacity and will handle grain at the rate of 1000 bushels per hour. All grain fed to stock is weighed over automatic scales. This elevator is electrically operated.

This season 225 head of heifers were fed in the yards. Part of these have already been shipped and five out of the six shipments topped the market. Also 5600 lambs were fed and the early shipments of these lambs topped the market. At the beginning of the feeding season the heifers were fed a ration consisting of 10 pounds of steamed rolled barley, 9 pounds of dried molasses beet pulp, one pound of cotton seed meal, and native wild hay. Later on corn was gradually substituted for the barley.

(Continued on Page 58)
EACH YEAR the Fort Collins Chamber of Commerce uses some industry was used, and the 1939 invitation emphasized the importance local industry as the background for elaborate printed invitations of the sugar beet as shown above. The 1939 Farmers-Merchants Party to the annual Farmers-Merchants Party. Last year the lamb feeding was held March 6, with a large attendance.
He Left Industrial Work to Try Farming—(Continued)

Simpson has operated the farm himself. He is a firm believer in a crop rotation program in which he carries alfalfa, potatoes, beets, corn, small grain and sweet clover. In 1937 his beets averaged 23.23 tons per acre and in 1938 the average yield was 22.17 tons per acre.

—J. S. Rice.

Don Dal Ponte Refused to Quit

DOWN at Sterling last year Don Dal Ponte had a good yield on a big acreage—132.35 acres to be exact, averaging 16.65 tons per acre, but this story is not about his big acreage or his good yield. This story is about what beets will do in a pinch. They did it for Don and they'll do it for others. This story is about planting beets very late in June, blocking without thinning late in July and grossing better than $53 per acre, figuring money in hand to date. Any crop that will do that is a good crop!

Some men quit and some crops are completely destroyed, but Don Dal Ponte did not quit even though his grain crop was completely destroyed by a hail storm of June 16 that cut across a large part of the Sterling territory.

Don plowed under the battered oat crop as soon as the soil would permit and planted a part of it to sugar beets on June 21. To save expense and since it was more of an experiment, he hand-blocked the beets July 25 without thinning the bunches that were left after the blocking.

When he completed his beet harvest of 132.35 acres, that yielded 16.65 tons per acre, he harvested the late planted field on November 10. This small field, planted after a grain crop had reached the headed stage and was destroyed, yielded 8 tons per acre with gross return to date of $53.36 per acre to the grower. After deducting the cash spent for seed and beet labor performed, and the rent share, this late crop so far has paid Don Dal Ponte $26.50 per acre for his labor of caring for it and hauling it to the dump. This is the value of a two-thirds share of the returns from two acres of oats yielding 75 bushels per acre at the present price of 75 cents per hundred pounds.

Does it pay never to give up? Don thinks so.
Government Tests Show Beet Tops Good for Dairy Cattle

BEET tops can be fed to dairy cattle with good results, according to 2-year tests, Scottsbluff field station, recently summarized by Paul C. Swanson, animal husbandman.

With proper precautions in feeding, it was indicated that beet tops “will give just as good if not better returns when fed to dairy cattle than when fed to any other kind of live stock.”

The study was made with view to comparing a ration of beet tops and alfalfa with a ration of alfalfa alone. The tops-and-alfalfa gave best results.

Quoting Mr. Swanson:

“In the first trial there was an increase in milk amounting to 10.1% and in butterfat 11.9% in favor of beet tops as compared with alfalfa. This resulted in an average increase of value of product of 5 cents per day, a 5 cent lower feed cost per day or a net income over feed cost per cow per day of ten cents when tops were fed. In the second year of the trial the milk increased in yield 6.9% and 10.4% increase in fat, when beet tops were fed. There was an increased value of product of 4 cents per day, 6½ cent daily lower feed cost or 10½ cents increase in net income over feed cost per cow per day. Summarizing this down to the mean results for the two years, the feeding of beet tops in the proportions given in this test resulted in an increase in milk yield of 8.5% and in butterfat of 11.15%. Although this indicates that tops might increase the per cent of butterfat, there are too many uncontrolled factors in regard to the per cent butterfat to make any conclusions in this respect at the present time.

“In comparing the values of alfalfa and beet tops as a cured roughage the following results are reported. During the first year trial, 1 pound of alfalfa was equal to 1.1 pounds of beet tops when compared on a dry matter basis. In other words in this test beet tops were 91% as valuable as alfalfa.

Feeding beet tops to dairy cattle in the Brighton district. Beet tops were found to be worth more than $5.00 per ton in Nebraska tests.

Estimating cured alfalfa in the stack at 90% dry matter and cured beet tops in piles or stack at 70% dry matter, beet tops were worth $5.64 per ton the first year and $5.18 per ton the second year when alfalfa
is worth $8.00 per ton. The mean of the two years gives beet tops a value of $5.41 per ton when alfalfa is worth $8.00 per ton.

"In giving beet tops the above valuation one must consider that the valuation of the tops is based on tops actually consumed by the cow and not as they are weighed off the field. As beet tops taken directly from the field usually contain from 10 to 20% dirt by weight, which is not consumed by the cows, the value of tops in this condition would be worth correspondingly less."

These tests indicated that best results are generally obtained if the beet tops are fairly well cured before feeding. Although the feeding of green tops stimulates greater milk production, one may run into difficulty. When green tops are fed it becomes very difficult to get the cattle to consume any hay or other roughage. Feeding green tops without alfalfa may cause excessive scouring and some digestive troubles. By feeding .1 pound of calcium carbonate (ground limestone) to each cow per day the amount of scouring will be materially reduced.

If the tops are well cured the cattle will eat some alfalfa or other palatable roughage.

By feeding the tops immediately after each milking in amounts that they will clean up in one or two hours, there will be very little of the beet tops flavor carried over into the milk. It tops are fed twice daily it generally works out best to feed the hay during the middle of the day. Hauling the tops in from the field and stacking them as soon as they are cured sufficiently to keep well is a recommended practice to follow. This keeps dirt from blowing into the tops and reduces the loss of leaves.

Mr. and Mrs. M. D. Swan in the Fromberg district, Montana, had the sad misfortune of losing their fine farm home by fire recently.

It's Thrifty to Beautify the Farm

By R. E. FORD
Extension Forester, Colorado State College

"A JOB worth doing is worth doing well." This old adage I often heard during my early school days. It was true then and in my opinion is equally true today in spite of the numerous changes and adjustments which we have experienced since 1900. Still as I travel through the highly developed irrigated sections of Colorado where live stock feeding is an important industry, I see countless examples where it is being contradicted in practice.

Both cattle and sheep are often being held in feed lots where little or no protection from winter winds and storms is available. Expensive feeds and labor are being supplied to obtain the rapid gains in weight and quality so desirable, and still the energy loss from exposure is allowed to continue.

Lamb-feeding tests conducted by the experiment station at Colorado State College have shown some rather significant results where some of the lambs have had protection and others have been fed in open lots. When the lambs, the feed, and the care were
Notice the fine trees at the end of this snug feed lot on the farm of A. C. Klaver, 10 miles east of Fort Collins. Such trees not only beautify the farm, but their value to the feeder can be measured in dollars and cents.

otherwise the same, the following brief results were obtained:

The protected lambs showed a gain of 5 pounds per head more at market. The feed costs were lower for those fed under protection by $3.98 per 100 pounds of gain. The net returns per lamb were 44 cents higher where protection was supplied. This totaled $44.00 gain for the 100 lambs on test. If this were expanded for a pen of 1000 lambs the gain would reach $444.00 which would be repeated each season that the feeding continued.

Many of the more practical feeders have placed tight board fences on the windward side of their lots such as were used in these tests. This is a step in the right direction, but only a step. These are expensive to construct, short lived, and only effective for a distance of one rod for each foot in height. They are often unsightly and must be repaired and replaced if the same area is to be used very long.

How much better it would be to have a row or two of long-lived trees on the north and west sides of the corrals! They would increase protection by 300 or 400 per cent. If properly located such a planting would serve for a lifetime and little or no care would be needed after it was well established. In the summer it would supply shade to the poultry and other live stock and would also add to the appearance and comfort of the home. The initial cost would be much less than the fence and the time required to get a serviceable windbreak is surprisingly short if adapted species are used. I firmly believe that if all stockmen could hear the remarks which are often made by ranchers who have such protective plantings, they would start this spring to develop this improvement on their farms.

Quite a high percentage of the ranches which have no wind protection do have some shade trees around the house, corrals, and outbuildings. In many cases, however, they were started by the early settlers and have
Shady trees are cheap to start and give long-lived benefits to the farm. Here is perfect live stock comfort on the farm of Ernest Meyer, near Lucerne.

almost served their allotted time. Trees, like men, will endure about so much abuse and neglect. A little attention now may increase their period of usefulness a long time.

May I urge that you no longer take them for granted and ignore them. Trim them up a bit this spring and plant a few new ones to carry on when the old ones come down for fuel or posts. In doing this now you may profit from the mistakes and experiences of the early planters and use varieties which are best suited to your needs. Your field superintendent or the county extension agent either has this information or is in a position to get it for you.

Rest assured that the tree you plant today will be growing into a valuable unit for many years. It will not only improve your farm and give service to you, but it will help to make living conditions more favorable for the whole family. This is something you cannot afford to overlook if the young folks are to be kept on the farms.

Osborn Farms, Inc., Loveland district, operated by Kenneth Osborn, has added that part of Colorado Realty and Investment Company's property north of the Big Thompson to their farm. The purchase was made late in 1938. Mr. Osborn is surveying ditches and fences preparatory to planting season.

George C. Beaumont, from west of Billings, has decided to rent his farm and move into Billings.

Sympathy is extended to the Alex Laber family of the Longmont district in the death of Mrs. Laber.

George Kreiger, Eaton, has hauled 97 truck loads of manure out of his cattle feeding pen, which will average three spreader loads per truck. Mr. Kreiger has enough manure hauled now for approximately 25 acres and expects to have enough more for an additional 20 acres. This manure is from 108 head of steers.
HIGH FERTILITY FROM FEEDING means high tonnage to these Morrill, Nebraska, men. Above is Frank J. Curry who, with his father, Robert Curry, feeds about 2,500 lambs a year. They get better than 18 tons per acre on a light soil.

L. G. Schultz, left, shown with self-feeder, feeds 41% dried pulp, 29% corn, 12% rolled barley, and 18% protein concentrate. Despite hail and worms, he averaged 17.82 tons of beets per acre.

M. N. Travis has 76 steers on feed. His well-bedded, flat feed yard will furnish plenty of manure for his beets which, in 1938, ran 21.48 tons per acre.

63
Elroy R. Lewis, son of Mr. and Mrs. E. E. Lewis of Cowley, Wyoming, was selected as a member of the live stock judging team at the University of Wyoming. The team placed first at the Ogden Live Stock Show.

Henry Kurtz, Giddings, tenant on the Fred Kluver farm, is fattening some heifers of excellent quality for the Denver market. This is the first feeding done on his farm in many years. Henry's son will graduate from the Wellington high school in June.

Robert H. Awmiller in the Beaver valley south of Brush has recently completed a new irrigation well. It is estimated this well will produce about 1,400 gallons per minute.

Sumner Burnham of Bayard district recently purchased a high grade registered Hereford bull.

Pete Wagner, Dominion dump, Longmont, has moved to the Melvin Harvey farm for the coming season.

Byars Clark, successful Eaton farmer and high yield beet grower, topped the heifer market in February. Byars had 295 pounds' gain in 111 days with a spread of 2 3/4 cents per pound.

W. J. Brown, prominent landowner and stockman of Eaton, recently bought the Blake farm of 200 acres located two miles north of Eaton. Hershel Brooks of Severance, son-in-law of W. B. Gress, will take over the farming of this excellent farm.

Mr. V. L. Stapleton will once more take over the direct operation of his 160-acre farm in the Bijou territory of the Fort Morgan district this year after having the place run by tenants in the past.

Jake Bruntz has taken over the operation of the old Nagel place at Lory beet dump, Windsor. He has fed cattle this winter and, with this year's good water outlook, expects to harvest a big beet crop this year.

Alex Rutt has moved from the A. F. Bateman place at Mountain View School to the N. R. Lee estate at Johnstown. Arthur Harding moves to the Bateman place.

Boys showing calves at the National Western Stock Show at Denver in the "catch-it-and-you-can-have-it" class placed for several prizes—Herman Volz, Ovid, second; Jake Van Dyke, Ovid, fifth; Albert Volz, Ovid, sixth; Lawrence Lowery, Sedgwick, ninth; and Willie Volz, Ovid, tenth.

David K. Amen of Logan in the Sterling district harvested 25.65 tons per acre from 1.89 acres this past season. His achievement is remarkable when it is recognized that this is almost double the average yield of the receiving station to which his beets were delivered.
Here are some of the prize-winning Herefords of John Heinz & Son. Photograph, courtesy of The Hereford Journal.

John Heinz & Son, who own several fine farms and also what is known as the old P-F ranch near Henry, Nebr., have a splendid herd of registered Hereford cattle. At the Denver Stock show this year they won second on a carload of Senior bulls which weighed 1,025 pounds at 14 months of age and fourth on a carload of Junior bulls which weighed 700 pounds at 8 months. The 30 head sold for an average price of $287. These were fed on a ration of dried beet pulp, rolled oats, rolled barley, corn, bran, corn silage, molasses and ground alfalfa. Heinz & Son have exhibited at Denver the past three years. In this time they have shown four carloads and won one first, one second, one third and one fourth. They have also shown a car each year for three years at Fort Worth and won a second, a third and a fifth there.

At a meeting of landowners and directors of the North Sterling Irrigation Company held on January 7th, definite plans were begun to increase the storage capacity of the North Sterling reservoir. At present the reservoir has a rated capacity of 67,000 acre feet of water. The plan is to increase its capacity to 81,000 acre feet.

Victor Baseggio at Hall, Sterling district, has bought from the Tax Service Corporation the 80 acres adjoining him on the east.

Charles F. Welch of Cowley, Wyoming, has been selected president of the Sidon Canal. Charley is one of the largest beet growers at Cowley.

Raymond Johnson, Porter dump grower in Mitchell territory is completing another year of successfully feeding beet tops to his lambs. Less than a 1% death loss gives weight to his recommendation that the tops be ground for lambs. Grinding minimized the danger of choking and enabled him to use a scoop shovel in
accurately distributing the tops at the panels, he stated. Starting with a small amount of tops fed daily the lambs were given gradually increasing amounts up to the maximum quantity fed.

C. H. Nichols, grower at the Baxter station, Minatare, is building a four-room house on his farm. He is going to have 65 acres of beets and is going to turn all of the beet work over to John Fisher on a 50-50 basis.

George B. McClellan of East La Salle is spending part of the proceeds of his 22.6 ton beet crop of last year in improving the water system for his farm.

Roy Kohler, successful young farmer of Kersey, has probably the largest herd of pure-bred pigs in Weld county. A large part of the development of his herd was accomplished as his 4-H club projects. Roy operated part of the Charles A. Bresnahan farm at Kersey last year. His beet yield was 20.67 tons per acre and his other crops were also outstandingly good.

Gus Gremel and his three boys in the Brighton district are very consistent growers, handling each year about 30 acres apiece, or 120 acres from the family.

Arnold Tippetts, son of H. S. Tippetts, prominent Lovell stockman and beet grower, was married February 1 to Lavonne Houston of Lovell, Wyoming. Arnold returned to Lovell late last fall, having spent the past three years in Sao Paulo, Brazil, on a mission.

Alex Libsack has moved to the Lenhart farm, Sears station, from his own farm at Janise station. John Froscheiser will take care of the beets on both places.

Leo Schumacher of Minatare has been appointed executor of the estate of his father, the late Math Schumacher. He is going ahead with farming plans on their several farms.

Jacob Weinmeister, Stegall station, Lyman, is improving from injuries received in an automobile accident last fall.

Miss Charlotte Krogdsdale, daughter of Mr. and Mrs. W. L. Krogdsdale of Deaver, Wyoming, won a trip to Washington, D. C., through her 4-H club activities.

Logan County 4-H club members won their share of honors at the National Western Stock Show in Denver. Billy and Arthur Brown won first and sixth and also reserve champion in the Shorthorn class. Donald Bostron won first, second and third prizes in the Angus class. Donald also captured third prize in the three head of fat steers. Gerald Dick took fifth prize in the Angus class. Gerald also won third prize in the “Catch It” class. Tommy Pom-
eroy won eighth and ninth in the Hereford class and received fourth prize in the three head of fat steers. Junior Schaffer took sixth prize in the Angus class.

Jay Hepperly, who has recently resigned his position as Keith County agricultural agent, has taken active charge of his farm on the North River.

Henry Harding, Jr., is to farm the Bowen Investment Company's place at Officer, formerly operated by Henry Schaffer.

George Kern, Windsor grower, recently topped the Denver market with fat steers. Mr. Kern uses G. W. S. Co. "C" molasses and beet pulp.

Victor Asmus, Fort Morgan, has moved to the Harry Epstein farm and is now preparing to have out manure for 50 acres of land that will be spring plowed. Last fall Vic got busy and manured and fall plowed 45 acres before he moved on the place.

Lorine Kaasch and Johnny Baggs were recently married. Mrs. Baggs has weighed beets at the Thomas dump, Scottsbluff, for fourteen seasons. Johnny is a beet grower who has been delivering his crop at the Thomas station for several years. Now we understand why Johnny always drove his own truck and would never hire a hauler.

E. L. Nicks, beet grower, stock feeder, and general farmer, has just completed construction of a new modern bungalow on his farm three miles east of Pierce.

W. J. Murchy, a prominent farmer and beet grower in the Fort Morgan district for many years, was recently appointed to the Board of County Commissioners by Governor Carr to fill the vacancy caused by the death of Walter Hochstenbach.

Arthur D. King, Hurick, is vacationing in the east as the guest of Swift and Company.

Louis Spomer of Ashton is assisting in the automobile licensing office at the Greeley court house giving driver's examinations.

Warren Monfort of the Lucerne district, successful commercial cattle feeder, has been topping the Chicago stock market with heavy steers recently.

Sam Van Gundy and one of his prize Hampshire wether lambs.

Sam Van Gundy of Sterling, continues to take top prizes on his Hampshire sheep among the state's best breeders. At the 1938 Colorado State Fair he took the Colorado special prize; first prize, Hampshire; special flock prize; second prize for showmanship, and 29 other prizes on his Hampshire sheep. At the 1939 National Western Stock Show in Denver, Sam took five firsts, three seconds, a third and a fifth prize on his lambs. This is an enviable record.

Fourteen Sedgwick county 4-H club boys took twenty-one calves to the
National Western Stock Show in Denver. Charles Toyne's calf, of Sedgwick, placed second in its class; Clem Price, of Sedgwick, seventh with his entry, and Willie Volz, of Ovid, took eighth in the Shorthorn calf class.

Farming their own land now—William Rutz, left, and his son, Henry.

William Rutz, of the Windsor district recently purchased the Law farm formerly operated by William H. Jacoby. Mr. Rutz was born in Saratow, Russia. He served three years in the Czar's army, married Katherine Hettinger in 1909 and came to America in 1911. For four years the family contracted the hand work on sugar beets. In 1915 they rented a farm and began farming for themselves. Seven years ago they rented one of the Law farms and in 1938 harvested a 20-ton crop from this place. Mr. Rutz and his family have long looked to the time when they could own their own farm and are now happy in their new location.

A. W. Avery of Eaton district, large commercial feeder, has been consistently topping the heifer market in Denver.

On February 16 the farm house of Mrs. Addie Miller of Powell, Wyoming, burned to the ground. Mr. and Mrs. Lloyd Krause were renters of the farm. The house caught on fire while they were away from home and practically all their belongings were lost.

Henry C. Hessler who purchased the George Stalbaum 80, Minatare, is going to farm it in connection with his father's 160 acres. Henry is planning on 100 acres of beets for this year.

Charles Henry, son of a successful dairyman, C. W. Henry, southeast of Greeley, has completed four years of club work in dairy projects and was 4-H dairy champion of Colorado in 1938 with a Holstein cow, with which he had started four years ago.

Conrad Kinsfather, Hartman station, Lyman, has purchased the Ida Surratt farm. This farm joins Con's home place on the west. The Surratts have purchased one of the Searle farms in the Janice territory.

The Foster farm at Pine Bluffs, Wyoming, has four irrigation wells and plans are being made for a substantial beet acreage this year. Beets have not been grown on this farm for the past several years.

Russell Billings and Duane DeVotie are feeding and intend to finish about 100 head of steers from the Painter ranch. It won't be long until their Weldona place will show the effect of feeding and good cropping.

Halley Carroll, grower at Fife district, Loveland, had a very pleasant trip to the east coast and is a proud owner of a car he purchased in Detroit, Michigan on his way home.

J. N. French, Julesburg, has been appointed on the government beet acreage allotment committee for 1939.

Victor Hessler of Atwood sold Hampshire hogs on the Denver market February 22 for a price of $8.75. This was not only the extreme top of the Denver market but was the highest price at which hogs have sold in Denver up to that date this past year.
It was also above the top price paid for the same day in either Kansas City or Omaha.

On February 14 Harry and Oscar Anderson of Powell, Wyoming, sold the last four cars of several hundred lambs they were fattening to a transient buyer. The next day a blizzard hit this locality, which will long be remembered as a "humdinger." The fat lamb market started to drop on the day of the blizzard. A week later friends told Harry he made a good sale. "Yes," Harry replied, "it looks as though the price of fat lambs has 'gone with the wind.'"

Pete Deines is going to farm the F. S. Cope farm in the Minatare district this year.

Philip Schlagel, successful farmer south of Kuner, has purchased the Carl C. Tams 80-acre farm which he has leased to Sam Steinmetz of Kersey. Mr. Steinmetz, together with his brother, Dan, secured a beet yield of 21.26 tons per acre in 1938 on the Albert W. Avery farm at Kersey.

Shown here on the lawn of the Powers home east of Windsor is Carlet Lad No. 229289, May 7, 1937, Sire "Carbo" 215034, dam "Dollie" 204123. This horse, owned by Cody Powers, was shown at the 1939 Stock Show in Denver by Harold Kreiger of Eaton, and brought home the blue ribbon for his class (stallion one year and under two years).

J. A. Morehead of Hartman station, Lyman, is moving to Kimball, Nebraska, where he has purchased a pump irrigated farm.

George Libsack, grower at Minatare, has entered a hospital at Grand Island. We wish him a speedy recovery.

C. D. Mobley, who has lived 12 years on the same farm near the old Woods station, has moved to a farm in the Windsor district.

Ray J. Winger has recently completed two new irrigation wells on his farm in the Beaver valley. Mr. Winger recently sold one load of steers on the Chicago market for $12.75, a new high for this valley.

Henry Reifsneider has rented the Vanatta farm formerly occupied by John Michal, in the Bayard district. He intends to live on this farm and also farm the Roscoe place purchased this winter.

Don Neighbors, Longmont, has moved to the C. O. Van Note farm, while his father, Will Neighbors, who has farmed this place for several years, has taken the Ludlow farm, formerly farmed by Arthur Van Thuyne.

The Lodgepole Valley Irrigation Development Company at Sidney obtained another irrigation well this winter, which will enable them to increase their beet acreage this year.

Mr. F. A. Trinkle is building improvements on his school section at Wiggins. This will make another good farm in that district.

William H. Jacoby has moved to Severance to the Law farm which he recently purchased. This is the farm formerly operated by Herchel Brooks.
Ivan Lynn of Deaver, Wyoming, had the misfortune to see two shattering hailstorms crack down on his crops last year. The first storm hit just after thinning and the second struck in July. Yet he finally harvested better than 15 tons per acre, where other crops made almost complete failure. His experience was repeated by other Lovell district farmers. Of the 11,413 acres harvested, 8,253 were hailed; 3,135 were hailed twice; 810 were hailed three times and 172 acres, four times.

David Hartman, son of Grant Hartman, high tonnage grower of the Morey district, Longmont, has moved his dairy herd from Boulder valley back to the home farm.

Three Baby Beef clubs have been organized in Keith county this year. Carl Haldeen is the leader of the "Baby Beef Boosters" club from the Cotton Wood Corner district. Bruce Snyder leads the "Lone Tree" club on the North River and Willis Babbit the "Prairie View" club south of Paxton. Twenty club members now have 27 calves on feed.

At Powell, Wyoming, feeders have sold most of the lambs. Approximately fifteen cars remained to be sold as of March 1. The cattle feeders have contracted the large majority for future delivery. About four hundred and fifty head on feed have not been sold.

Carl P. Barber of the Johnstown district has purchased the George Stroh farm southwest of Greeley which he is improving and preparing for early crop planting this spring.

John Michal has rented the W. H. Pitzer farm near Bayard, formerly occupied by E. E. Kenzy.

Allan Evans, Minatare, recently purchased a new Farmall tractor.

J. L. Lippincott, Lyman, Nebraska, has purchased the J. A. Morehead farm at Hartman station. Mr. Lippincott is renting this 80 acres and an adjoining 80 that he bought last spring to William Maul.

Alex Brunner, Sr., tenant on one of the A. C. Kluver farms at Black Holley, has retired from farming. His place has been taken by Chris Heinz, formerly of Severance.

The second company drilling for oil in the Lyman territory has started operations on the O. O. McHenry estate five miles east of Lyman. This farm is operated by Ray L. Barrett, Joyce station.

Robert Redding, Minatare, spent two weeks in Kansas City in Army training school. He is a reserve officer in the air corps.

Blas Abalos has leased two farms northwest of Snyder which he and his son, Ben, will operate this year.

Calvin Eiker and Billy Wilder, 4-H club members at Big Springs, showed their calves at the Stock Show in Denver this year.

Arthur Martin, Loveland district, made a good sale when he sold his heifers on the Denver market.

F. E. Buckingham has purchased another quarter section north of Wiggins, and under his businesslike management this will make another good farm for the community.

C. G. Durnin of Scottsbluff recently purchased a beautiful pair of four or five-year-old purebred black Percher-
on mares from the E. P. Cromer estate.

Peter Schell will farm the Carrie Perry farm at Jessum in the Longmont district this year.

Dr. E. J. Mitchell of Scottsbluff, who has purchased several farms in the Bayard factory district during the past several years, recently purchased the Harper farm, tenanted by Tony Stelma in the South Bayard district.

The Shader boys of Harmony district again rang the bell at the Denver Stock Show this winter by placing their entries among the tops in various classes as follows: Reserve champion barrow Spotted Poland, 1st, 2nd and 3rd on hogs; 7th on Hereford yearling; 6th on registered Angus heifer; 7th on Angus bull; 1st on cow, calf and heifer. They have been in the winning for the past several years and are consistent young stockmen.

E. W. Siebert, Windsor, was not raised on a farm. He first came to the farm two years ago. At the close of his second year Mr. Siebert harvested a 40-acre contract of beets that averaged 20.8 tons to the acre. Mr. Siebert married a daughter of Mr. and Mrs. John A. Challgren. Mr. Challgren has personally supervised the farm and the result is a tribute to both men.

New at farming, E. W. Siebert got better than 20 tons per acre last year.

Jacob Stumpff, near Hillrose, Colorado, harvested an average yield of 21.97 tons per acre, one of the ten highest yields in the district in 1938. Mr. Stumpff is now feeding 2,000 head of lambs on the farm with his landlord, R. B. Graham. They expect to start shipping in the near future.

The home of B. J. Reeder, near the Mintle dump, Scottsbluff, has been totally destroyed by fire. At present the Reeders are living in the beet shack until the farm home can be replaced.

Mr. and Mrs. Dave Guinn of the Loveland district have moved to their farm which was operated by V. H. Harris.

W. L. Oakley of the Gowanda district, east of Longmont, is recovering from serious injuries sustained in an automobile accident the latter part of January.

Conrad Lenhardt, Jr., is moving from the Hesper district, Montana, to the A. G. Carlson farm at the Siding Two dump.

Robert Roemer, prominent in the Guernsey cattle breeders, has been appointed to the State Board of Agriculture. Mr. Roemer should be of much assistance to the dairy industry of the state in that he knows its needs and requirements to bring Colorado into the dairy picture.

Christ Rudio, grower near Yegen, Montana, bought the J. R. Collard farm at Siding Two. Christ Rudio, Jr., will farm the new place.

The old Cedar Valley school, located six miles southwest of Gering, has
been replaced by a modern school building. A large room in the basement will serve for community meetings. Mr. A. N. Mathers of Gering spoke at the formal opening.

John Berens Uses His Tractor.

When it became necessary to get an extra load of beets in to the dump to avoid frozen ones the next morning the versatile Farm-All tractor was brought into service. The picture shows John Berens delivering beets at the Bracewell beet dump, Windsor. Such sights as this are becoming more common each season.

John Amen of Harmony district, acting as an innocent bystander, came out third in an argument between a horse and a young mule. John was petting the mule when the horse objected and charged, knocking John down and breaking his leg. John has been in bed in a cast for the past six weeks, but is now recovering satisfactorily, we are glad to report. (In the future, John, refrain from these petting parties.)

Oscar Bloom will farm the Doctor Bixler place at Erie, having moved there the first of the year. He did considerable fall plowing there after beet harvest.

Don L. Stebbins, who lived in the Siding Two community, has moved to Edgar, Montana.

About one hundred and fifty little pigs arrived at the Schaefer ranch, Fort Morgan district, the past few weeks. Conrad intends to make choice hams and bacon from this pure bred stock.

Wesley Johnson, Julesburg, has just returned from a trip to the west coast. He reports that sections of California have fine stands of beets up and that thinning is in progress.

R. E. Woodward, near Snyder, has shipped out two carloads of lambs, one to the Omaha market receiving 9 cents, and the other to Chicago receiving 9½ cents.

George O. Howard, Melbeta, has added another room to his home this winter.

The Lillian Andrews farm one mile west of Stegall station, Lyman, has been purchased by Paul Covington, of Morrill.

John Kinghorn of Shepherd, Montana, has purchased the farm south of his, formerly owned by H. D. Soelter.

Clarence E. Johnson and family spent January in California. He is one of the high tonnage growers of the Plumb district, Longmont.

John Helzer, a prominent grower in the Fort Collins district, passed away recently, a victim of a heart attack.

J. E. Labertew of Mitchell has purchased George Rickard’s farm of Melbeta. His nephew, J. R. Labertew, formerly of Gering, plans on raising 25 acres of beets this year.

George Heidema, Jr., has purchased the 80 acres one mile south of Dennis dump, formerly farmed by Ray Laramer.

J. Arthur Anderson, at Buda dump in the Loveland district, has a young son who has a start to be a future
farmer of America. He has three Club calves that he is taking good care of and they are doing fine.

Alec Leis, whose arm was badly injured in a corn shredder some time ago at the Arthur Steyaert farm near Hillrose, is improving nicely at his home and considers himself fortunate in not losing his arm.

The Clarks Fork valley people of Montana extend sympathy to the Premo family for the loss of their mother, Mrs. W. D. Premo. Mrs. Premo was the mother of Ray, Walter, Ike, George, Leslie and Leland Premo, and Mrs. Val Seljak, all of whom are prominent beet growers in the Clarks Fork valley. Mr. Premo was one of the early settlers in this county.

R. G. Neeley of Scottsbluff, bought the Archie S. Lee place at Melbeta this winter. Fred Romick will continue farming this place. Mr. Neeley contemplates putting some of the dry land on this farm under pump irrigation.

Mrs. Paul Peasley of Harmony district has been seriously ill this winter from rheumatic fever. Her condition now is showing improvement.

Vance Pumphrey, son of Mr. and Mrs. F. D. Pumphrey of Lyman, was named as a winner of a prize trip to the annual 4-H club conservation camp held annually at Seward, Nebraska. He is one of only 41 members and local leaders getting such a trip throughout the entire state.

Glenn Johnson, son of Ed Johnson, grower in the Fort Collins district, won three places on his Range Sheep showing at the National Western Show in Denver this winter. Glenn was also a member of the F. F. A. judging team to Kansas City last October.

Wiley Thomason farms east of Hillrose, Colorado. He is feeding lambs this winter. Mr. Thomason has been a consistent feeder for a number of years. He planted 26 acres of beets that yielded 20.18 tons per acre in 1938. He believes in following good farming practices such as manuring, planting on a well-prepared seed bed and planting early. He is also an advocate of close spacing and early irrigation.

G. C. Binder of Milliken has returned from California where he spent several weeks on a vacation.

Louie Flower, Jr., son of Louie Flower, Minatare, entered the University of Nebraska at the beginning of the second semester. He is taking law.

W. B. Jeffries, northeast of Hillrose, has completed his new irrigation well. He has it all equipped electrically and has a flow of 1,500 gallons per minute. W. B. is planning on some bumper crops now.

Leon Hendricks, grower in the Fromberg district, Montana, has purchased one of the fine farms formerly owned by Pete Delmonica of the Overstreet district.

E. H. Kibby of the Loveland district has rented his farm and is now selling farm machinery. Ed. should be able to talk from experience gained on the farm.

Henry Dittenbur of the Mitchell factory district has moved to the farm owned by E. E. Hill in the Minatare district. He is planning on 65 acres of beets.
George Konishi is doing well with his Guernseys.

George H. Konishi, Platteville, Colorado, is one of the leading Guernsey dairymen in the Moore district. A cow named "Josie" produced 1,200 pounds of butterfat during the month of January. She took second place out of 349 cows on test in the Association.

Fred Daubert, Jr., son of Fred Daubert, grower in the Fort Collins district, has been appointed field man with the Farm Security Administration of the United States government. He is now stationed at Lamar, Colorado. Mr. Daubert is a recent graduate of Colorado State college.

Fred Weber, Minatare, has purchased the A. G. Sims 160-acre farm. Mr. Weber has farmed this land since 1931.

Charles F. Haines and B. B. Peterson of Hillrose walked off with several blue ribbons for their potato exhibits at the Morgan County seed show recently.

The following Fort Collins district girls in 4-H club work won state championships as follows: Barbara Watts, Timnath, state champion in home furnishings; Betty Jane Cummings, Timnath, state champion in clothing; Gladys McGee, Laporte, state champion in canning. These young ladies were given as rewards, a trip to the National Western Stock Show in Denver. Larimer county was fortunate in winning the three firsts in these classes and the girls are to be congratulated on their achievements.

G. George Schnell, who has farmed a number of years in the Minatare district is moving to a farm in the Sidney district.

Walter Miller, recently purchased and now occupies the Snyder farm formerly tenanted by Tony Bandur in the Craft district, Bayard. His brother Paul also purchased the Fox farm formerly tenanted by Sauer and Buxbaum, in the Craft district. Paul will continue to operate his filling station and the farm will be farmed by his brother Walter.

Johnny and His Champion

Johnny Matsushima, senior of Platteville high school, a member of the 4-H club, fed a Painter-bred Hereford steer which won first place in the county and took the grand championship in the fat steer class at the state fair. As a result of this showing, Johnny won a free trip to the National Western Stock Show.
Be Prompt...

But take plenty of time to make a good seed bed.

In a late wet spring, like the present one, there is delay in getting into the fields.

As a result, some farmers feel under pressure to hurry their seed bed preparation as rapidly as possible in order to get their crops in on time.

With the beet crop, prompt work is important. But doing the job RIGHT is more important than speed.

There are real advantages in planting at the earliest favorable opportunity, but the advantages of early planting are lost if seed is planted on a poor seed bed.

A loose, trashy, cloddy seed bed, full of air pockets, results in poor germination and poor stands. You lose time, rather than save time, in planting on such a seed bed.

Take whatever time is necessary to pack the seed bed firmly, all the way down. Seed properly planted in a garden-like seed bed will reward you with a good stand on which to build a high-tonnage crop.
Table of Contents

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Don't Be Late for the Train—Dr. H. E. Brewbaker</td>
<td>39</td>
</tr>
<tr>
<td>Sugar Beets Mean Solvent Agriculture</td>
<td>41</td>
</tr>
<tr>
<td>Farmers May Be Paid to Plant Shelterbelts</td>
<td>43</td>
</tr>
<tr>
<td>The Manure-Live Stock Feed Relationship of Different Types of Manured Rotations—Lionel Harris</td>
<td>46</td>
</tr>
<tr>
<td>Over 17½ Tons on 340 Acres</td>
<td>51</td>
</tr>
<tr>
<td>All Hail the Beets—E. S. Willis</td>
<td>52</td>
</tr>
<tr>
<td>Turkeys Help Produce High Yields</td>
<td>54</td>
</tr>
<tr>
<td>He Left Industrial Work to Try Farming</td>
<td>55</td>
</tr>
<tr>
<td>Don Dal Ponte Refused to Quit</td>
<td>58</td>
</tr>
<tr>
<td>Government Tests Show Beet Tops Good for Dairy Cattle</td>
<td>59</td>
</tr>
<tr>
<td>It's Thrifty to Beautify the Farm—R. E. Ford</td>
<td>60</td>
</tr>
<tr>
<td>Around the Territory</td>
<td>64</td>
</tr>
<tr>
<td>Be Prompt—But Take Plenty of Time to Make a Good Seed Bed</td>
<td>75</td>
</tr>
</tbody>
</table>
THROUGH
THE
LEAVES

MAY, 1939

THE GREAT WESTERN SUGAR CO.
Ask any housewife what sugar she likes best

THE GREAT WESTERN SUGAR COMPANY
Crop Management Will Tell the Story!

Crop management will be a decisive factor in determining whether farmers will equal or beat the high yields of beets harvested in 1938. The acreage is larger; the irrigation outlook is good. Getting the crop up and properly blocked and thinned is the immediate program.

As of May 9, the Company had contracted 243,042 acres of beets, an increase of 22,273 acres over the acreage of 220,769 finally contracted in 1938. By districts, contracted acreage as of May 9 was as follows: Colorado, 140,625 acres; Nebraska, 57,079 acres; Wheatland, 7,037 acres; Billings, 26,735 acres, and Lovell, 11,566 acres.

April and early May were dry and irrigation for germination was being applied on many farms. As we went to press, farmers were being urged not to delay in waiting for rain, if surface moisture was insufficient for germinating seed.

Reservoirs serving the Colorado district were reported May 1 as storing 595,320 acre feet as compared with 595,320 on the corresponding date last year. North Platte river reservoirs, serving the Nebraska district, were reported as having about 700,000 acre feet in storage May 3.

With good subsoil moisture and favorable irrigation outlook, farmers should watch carefully the upper soil zone in which germination takes place and the young seedlings get their start. If inadequate moisture is supplied to this zone, stands may be reduced and growth retarded.

Too much emphasis cannot be placed on supervision of labor. If the farmer wants 12-inch spacing, or 10-inch spacing, the way to get it is to enter the field frequently, and offer cooperative suggestion to the workers. Since some beets are normally lost each year between thinning and harvest, it is desirable to ask for closer spacing. For example, if a farmer asks his labor to space beets 10 inches, his stand at harvest may average 12 inches. If he asks for 12 inches, his stand at harvest may be 14 inches or so.

With hot weather stimulating growth, beets are expected to come on rapidly this year, and farmers who are prepared to block mechanically will find their foresight repaid.
WOULD you believe that this beet field, choked with volunteer alfalfa 10 inches high, would yield 22.56 tons per acre? It did last year at Sterling. Heavy rains prevented cultivation for weeks and alfalfa got the best of the beets. But mechanical blocking saved the day! Here you see the 2-row Dixie Cotton Chopper cutting out beets and alfalfa to 10-inch spacing, May 29, on this 19-acre contract.
Securing a Satisfactory Stand of Beets

By DR. H. E. BREWBAKER

NO ONE knows quite as well as the sugar beet grower what it means to get a “satisfactory” stand. It is easy to sit down and dictate what should be done and just how to do it, but no amount of dictating from a swivel chair can obviate the necessity of making vital decisions in the field. The grower who consistently produces 20-ton crops makes these decisions with a high degree of accuracy. It is this successful grower, however, who advances the most questions. This is not surprising since the more one really knows about a particular problem the more modest he becomes, and the more he realizes the lack of information.

Why is the question of stand of so much importance as to merit considerable attention at this season of the year?

First, we have noted that the 20-ton growers are very particular about stand; I have even seen one go so far as to count his thinned beets each day during hot dry weather to see if he was losing stand, and, in doing so, to determine the time to start the first irrigation. Second, experimental studies have shown that material losses result from skips in the stand; in other words, a uniform stand is essential to satisfactory production. Third, where the sugar beet crop is looked to for the major source of cash income on the farm, as is true over much of the sugar beet growing areas, additional care and effort in securing a good stand is usually amply rewarded at harvest time.
Fundamentals for Good Stands

Several factors, about which we can do little now except plan for next year, are necessary, or at least helpful, in assuring good stands year after year, and they should be mentioned in passing.

1. Previous crop. Such cultivated crops as peas, beans, and corn cut for silage, are usually preferable to alfalfa or sweet clover to precede sugar beets. If prepared early in the fall, small grain land can be worked into a very good seed bed.

2. Fall plowing, except on land likely to blow during a dry winter, is generally conducive to good seed beds.

3. Spring plowing must be worked quickly and packed thoroughly if sufficient moisture is to be retained for germination.

4. The foregoing three points have to do with efficient seed bed preparation. While loose, cloddy seed beds are occasionally successful, generally the grower is well repaid for additional effort to produce a firm, garden-like condition before planting.

The Current Problems

This has been an unusual season with few opportunities to do any field work from late fall until late spring. With the natural urge to plow early, many fields were worked too soon and a mass of unworkable clods resulted. With supplies of water generally ample for irrigation, there is much interest in irrigating-up, a practice which is followed almost completely in certain areas such as the Arkansas Valley and the Western Slope. This should be done, wherever necessary, to assure good and uniform germination stands. Many fields show a very spotted initial stand. In such cases an irrigation will bring up those portions of the row where the seed went into dry soil. The thinners should be cautioned in such cases not to cut out those portions of row coming up as a result of the irrigation.

This first irrigation, and later ones during the early growth of the plant, should be light as possible to wet thoroughly only the upper soil layer 1 to 2 feet deep. We must remember that plant foods, particularly the nitrates, are quite soluble in water and, as such, can easily be carried down into the soil so deeply by a heavy irrigation that the roots of the growing plant do not reach them in the early stages, or they may be lost completely by leaching out into drains or underground streams. Yellowing of the leaves at this stage may be the only outward sign of partial starvation or lack of food resulting from over-irrigation.

Mechanization of Field Work

Blocking and thinning may very well be changed greatly before many years as the result of extensive investigations on sugar beet machinery being conducted cooperatively by the United States
Department of Agriculture, State Experiment stations, and Sugar companies.

Mr. E. M. Mervine of the United States Department of Agriculture, has recently predicted the complete elimination of "stoop" labor through the use of single seed planters, making blocking and thinning with long handled hoes possible. There will be more "doubles" than in the usual system, but these doubles, up to a certain point have little effect upon total yield and are not considered serious from the topping standpoint in view of the probability of practical mechanical harvesters.

For the present, however, the blocking may be done either with the machine or by hand and followed by the usual thinning procedure. Where germination stands are good, blocking should be done with a machine (the Company fieldman can provide the details of equipment necessary) thereby assuring the width of spacing in the row along with an excellent cross cultivation and a material net saving in time for the entire blocking and thinning operation.

**Careful Thinning Necessary**

A careful job of thinning is most essential to a good stand. The grower-labor relationship shows up at this point more than any other. A preliminary definite understanding when the contract is signed, supplemented by instruction at the start of the work and frequent succeeding visits to the field, are basic to getting the job done as desired. If blocking is done by hand, it should be understood that deep cuts with the hoe which leave a trench where the row once was, with the singled beets hanging on by a thin root exposed to the hot rays of the sun, will not be tolerated. Good stands are not obtained by this type of blocking. On the other hand, a bit of praise for good work is not wasted.

Except where "blackroot" has been serious and plants may be weak because of disease, there is little merit in insisting on thinning to save the strongest beet. This may be somewhat of a surprise to old timers in beet growing, since at one time this point was stressed very strongly. The important thing, in accord with more recent experimental evidence, is to leave the individual beet disturbed as little as possible by blocking and thinning.

Soil crust, resulting from dashing rain, often becomes a serious hazard to a good stand. Quick action is usually necessary, and sound advice comes only from wide experience such as gained by experienced growers, the field men and Company managers.
EVIDENCE continues to accumulate on the high feed value of Great Western "C" molasses produced at the Johnstown plant. The 1939 feeding experiments at Scotts Bluff Experiment station proved "C" molasses to be more profitable than cane molasses for feeding lambs. Previous tests conducted under supervision of Colorado Experiment station had also shown "C" molasses preferable to cane in cattle feeding.

Paul Swanson of the Scotts Bluff station reported that lambs receiving cane molasses gained .30 pounds each day as compared with .29 for "C" molasses; in other words the gain was practically the same, yet cane molasses cost $20.00 per ton against $8.00 for "C" molasses.

The report from the Scotts Bluff station is as follows:

"Interest in the comparative value of cane and beet molasses, has resulted in repeating this experiment. Other than the molasses fed, the two rations consisted of barley, dry pulp, wet pulp, beet tops and alfalfa. In other words, these two rations are composed mainly of beet by-products. "Lot 9, receiving cane molasses, gained .30 lbs. each per day, and lot 10 receiving beet molasses, gained .29 lbs. each. The feed required per 100 pounds gained, is very similar in both lots, however, favoring the cane molasses lot a little in each feed fed. As cane molasses cost $20.00 per ton as compared to $8.00 per ton for the beet molasses, the lambs fed the beet molasses produced the gain at a decidedly cheaper cost.

"The lambs in both lots carried a nice finish and had a healthy appearance. The daily gains were the second highest made among the ten lots. The feed cost per 100 pounds gain was $5.78 for the lot 9 and $5.01 for lot 10. A six pound shrink was figured for these two lots as compared to 4 pounds for the other lots. Both lots were appraised as top lambs.

"The estimated return over feed cost was 20 cents more per lamb for lot 10. Based on the results of this trial, cane molasses is worth very little more per pound than the Johnstown beet molasses. The cane molasses was slightly more palatable than the beet molasses. No difference was noted in regard to the physiological effect of the two feeds upon the animal. The maximum molasses consumption per lamb per day was .5 pounds."

Gardens! Gardens! Gardens!

A GOOD garden for every beet worker family in 1939! That is a common objective. Encouragement from the farmer himself is an important step in stimulating the beet worker to grow a garden.

Many workers grow good gardens every year. From their own experience they know it pays to do so.

How should the garden be planned? It should be large enough to furnish all the vegetables needed for summer use, and also for winter use. The garden for a small family should be at least 50 feet by 100 feet, and larger families should plant according to their larger needs.

They can find time to work in their garden. The only expense
LOOK AT THAT SQUIRREL
JUAN, HE ALSO STORES
UP FOOD FOR WINTER.

A GARDEN FOR EVERY
BEET WORKER FAMILY!
will be the cost of seed, and any good garden will produce vegetables worth many times that cost.

By growing the vegetables that their families need, they can reduce their store bills. This is the most promising way for them to supplement their money wages. The workers by taking advantage of a garden, in effect, increase their wages per an acre by $1.00 or more. They may reasonably expect a return of $30.00 or more in form of vegetables from a good garden.

A variety of vegetables should be planted, including:

- Lettuce
- Onions
- Spinach
- Beans
- Corn
- Red Beets
- Peppers
- Turnips
- Squash
- Carrots
- Cabbage
- Tomatoes
- Potatoes
- Pumpkins

A. M. Binkley in U. S. D. A. Bulletin 311-A, entitled “Grow Your Own Vegetables,” states:

“Every family should have a vegetable garden for the following reasons: (1) It will reduce the family food bill. (2) It will provide an abundant supply of fresh, high-quality vegetables in season. (3) It will supply the family with vegetables for canning, drying and for winter storage. (4) It will permit a substitution of vegetables in some cases for the more expensive foods. (5) It will provide a more healthful diet. (6) It will permit the opportunity to grow prize vegetables for the community fairs.”

Children especially need the variety of food that a garden furnishes.

The workers in cooperation with the farmers should start at once planting the gardens. The workers should plant plenty for all of their needs, and plan to have a surplus for canning, or drying, or storage in cellar or “dugout.” Potatoes, carrots, turnips, red beets, and cabbage are especially adaptable for storage.

It is to the personal advantage of the farmer that he cooperate with the workers in growing a garden. The more self-sufficient the workers are, the better off they are, as are also the farmer and the entire community. It is such a small job to be done and yet it can be of such tremendous value to the individuals concerned.

A. M. Park and son of Hardin, in the Greeley district, shipped their last car of lambs to Chicago April 25 and topped the market. They were fortunate in carrying their lamb feeding operations into the high market of the late spring.

Says Jake Walter, Jr., of Loveland: “Last spring was my first experience with cross blocked beets. I found that it paid me good for my trouble. From now on I will cross block wherever possible. I am satisfied all the way through.”
Report on Processor-Grower Relations

WASHINGTON news dispatches summarized only a few of the points in the 38-page statement, with exhibits and appendices, issued April 5 by the Sugar Division, U. S. Department of Agriculture, under the title: Preliminary Report with Respect to Processor-Grower Relations in the U. S. Sugar Beet Industry.

In the news stories that appeared headline emphasis was placed on grower risks compared with earlier years and processor earnings prior to enactment of the Sugar Act of 1937, but only secondary news importance was given to total compensations preponderantly favoring the grower under the Act and greatly reduced processor earnings during operation under the Act, as described in the report.

The law became effective September 1, 1937. The report points out that in 1937 the grower received 56 per cent and the processor 44 per cent of the calculated total returns and payments arising from the sugar proceeds of a ton of beets.

A preliminary estimate of the net income of processors for 1938 is the lowest in five years, amounting to $9,835,783, representing 8.56 per cent of net worth, according to the report. Regarding prospective earnings in 1939, the report goes on to say:

"It is estimated that the net income of processors for the fiscal year ending in 1939 will be substantially lower than for the period ended in 1938."

Redistribution of Proceeds Described

HOW operation under the Act has increased the income of the grower $1.00 and reduced that of the processor about 75 cents in calculating returns from a typical ton of beets, is developed in the following section from the report:

"With the passage of the Sugar Act of 1937 a change in the earning position of the sugar beet processor has occurred. The price for refined sugar is determined by the supply of and the demand for the product. Under a quota plan the immediate supply made available to the market is determined by law. The level of price results from the relationship of that supply to the demand situation. The imposition of an excise tax, under these circumstances, reduces the 'net proceeds' derived from the sale of the beet sugar by an amount equal to the tax. The amount available to the processor from the market under the established purchase agreements, is therefore reduced in an amount roughly equivalent to the tax, the income which the grower receives from the processor being reduced in an amount equal to approximately one-half of the tax. Although the payment to the producer from the processor declines, the producer receives back a government payment which..."
REDISTRIBUTION OF PROCESSOR-GROWER PAYMENTS

How total payments arising from the sugar proceeds of a ton of beets have been redistributed in favor of the grower under the Sugar Act of 1937, has been graphically illustrated by N. R. McCreery, Colorado District Manager of The Company, by use of the disk shown below:

1. Total returns from the sale of sugar from a ton of 16 per cent beets.

2. Without the processing tax, half of the return would go to the Grower and half to the Company.

3. The tax is deducted, however, and taken equally from the Grower and the Company.


5. Government pays Grower additional amount, arising from difference between tax collected and Grower payment, per 100 pounds of sugar.

6. Final relative receipts by Grower, left, and Company including the additional Government payment shown in Fig. 6.

88
greatly improves his position. For example, if a quota system were operative which would result in a net return from the sale of beet sugar of $3.75 per cwt., the producer would receive a return, per ton, under the purchase agreement in use in an important producing area in 1938 of $5.19 on a 16% sucrose beet. With the imposition of a tax of 53.5 cents per 100-pound bag, the net return would, other things remaining constant, decline to $3.215 per hundred pounds and the grower would receive from the processor $4.36 per ton of 16% beets, but, in addition, he would receive a government payment, if the conditions governing the receipt of such payments have been met, of $1.83 per ton or a total of $6.19 per ton. In other words, the income of the producer is in those circumstances increased by approximately 75 cents per ton of beets processed.”

Industry Less Efficient Under 50-50 Contract

The report contains many statements of interest in connection with agitation in this particular area for a so-called 50-50 percentage contract as distinguished from the “stated extraction” type of contract now in use. The report states:

“During the three-year period 1935-37 those sugar beet mills purchasing sugar beets under the stated extraction type of purchase agreement recovered approximately 4.5% more of the sucrose from the beets sliced than those operating under the fifty-fifty arrangements. On a sugar beet testing 16% sucrose this amounts to about 15 pounds of sugar. Although other factors may have influenced this result, it would appear that the economic incentives toward operating efficiency are more adequately provided by use of the stated extraction form of purchase agreement.”

The report outlines arguments which have been made by processors as to why the “stated extraction” type of contract makes for greater efficiency within the industry and ultimately enables the processor to pay the farmer more for beets than if the 50-50 type of contract were in use:

“Advocates of the so-called ‘stated extraction’ type of contract state that there is marginal sugar available. If a straight percentage distribution of the ‘net proceeds’ is made, then the processor is induced to ‘skim the cream’ as it were, by extracting only that portion of the sugar which can be recovered at low cost. If, by installation of a new machine, or by incurring an additional cost, more of the sugar might be recovered, the installation would not be made unless the value of the percentage of the sugar retained by the processor, let us say one-half, exceeded the cost of its extraction. For ex-
ample, suppose sugar could be sold at a return of 4 cents per pound. If, by a new installation at some point in the factory, additional sugar could be recovered but at a cost of 3 cents per pound, the processor operating under a fifty-fifty arrangement would not make the installation as he would lose 1 cent a pound for each extra pound of sugar extracted. He would incur costs of 3 cents and pay the grower 2 cents for the sugar, making total costs of 5 cents against which he would receive only 4 cents. If, on the other hand, a stated extraction contract were employed, the mere fact of recovery of additional sugar would not increase the cost of sugar beets, and the processor would have an opportunity of making profits by recovering marginal sugar. In fact, it is frequently argued that the improvements would, with the passage of time, probably enable the processor to pay more for his beets.”

Grower Pays Freight in Lake States

Also of interest in connection with the 50-50 contract agitation in this region is the matter of payment of freight on beets. In local discussions the so-called fifty-fifty contracts in the Great Lakes area are frequently mentioned. The report states:

“In general, it may be said that the processor in the Western states equalizes the freight position of producers whereas this is not the general practice in the states of Michigan, Ohio, Indiana, and Wisconsin. In these latter states the grower ordinarily pays the cost of transportation to the mill.”

(Editor’s Note: One small, single-factory Company in Colorado—the only Western Company using a so-called 50-50 contract—revised its 1939 contract terms by a new provision requiring the grower to pay half the cost of transporting beets to the mill. Three Companies which used a 50-50 contract on a non-Steffen basis in Utah in 1938 abandoned this principle of payment after one year’s experience and in 1939 returned to the ‘stated extraction’ type of contract which had previously been used.)

Lower Sugar Content and Lower Net Return

In discussions with growers, spokesmen for The Great Western Sugar Company have frequently made the statement that sugar content in Colorado-Nebraska beets normally tests somewhat lower than the average for the United States as a whole. The report gives weighted average for per cent sucrose content in cassettes of 16.49 per cent for the United States for the five-year period 1933-1937, inclusive, which is more than one-half per cent higher than the Colorado-Nebraska average of 15.97 per cent for the same period.

In conferences with beet growers Great Western executives have pointed out that the Company normally receives less for its
sugar than the average for the nation as a whole, and substantially less than realized by companies in the Great Lakes area.

The report states:

"It will be noted that certain districts are able quite consistently to realize a greater return per bag of sugar than other areas. For example, beet sugar produced in Colorado and Nebraska has generally been sold for about thirty cents per bag less than sugar produced in Michigan and Ohio because of location with respect to markets. Assuming that about 290 pounds of sugar are recovered per ton of sugar beets, it would seem that sugar produced from a ton of beets in Michigan will command about 90 cents more than sugar produced from a ton of Colorado beets. Sugar produced in the eastern Montana area has generally commanded a smaller return than sugar produced in western Montana plants. The differences are of course attributable to the transportation cost involved in shipping sugar to distant markets. Sugar is sold on the basis of its seaboard price plus freight to interior points, so the 'net return' from beet sugar produced in the mountain states declines as larger portions of the crop move eastward. The decline in 'net return' results from the fact that the freight cost is increased as the more distant markets are sought, and the sales value declines as sugar is generally sold on the basis of seaboard prices plus freight to interior markets."

Return from By-Products Lower in West

In this connection the returns from by-products, as discussed in the report, is of interest. The report states:

"A somewhat similar situation exists insofar as by-products are concerned. In the mountain states, where forages can be readily produced, but where market outlets are few, the value of by-products is far less than is the case in eastern states where the forage crops are shipped in. The total return from the products of a ton of sugar beets of identical quality is therefore consistently greater in some parts of the country than in others."

Elsewhere in the report occurs the following comment on by-products:

"It will be noted that these values are greatest in the Lake states, an area in which pulp is of relatively great value. Freight rates, as a rule, have not been such as to permit the shipment of pulp from the far western states to consuming centers where competition with alternative forages is less severe. The factories in the Lake states, on the other hand, have an accessible and profitable market for those products."
Facing Losses, Minimum Guarantees Eliminated

The report discusses changes which have taken place in beet contracts:

“For several years preceding 1932, sugar beets had been purchased under agreements which provided for a minimum guaranteed payment per ton of sugar beets plus participation on the part of growers in the event sugar prices exceeded certain levels. With the decline in sugar prices which occurred during the period following 1927 and 1928, the processing companies found themselves faced by large losses, particularly on the 1930 and 1931 crops. As a result, the minimum guarantee was omitted from the contracts thereafter and the returns to producers declined substantially.”

These developments are further mentioned as follows in the report:

“With the elimination of the minimum guarantee, the cost of beets, constituting ordinarily about one-half of all expenses, rises and falls with the variations in the return from sugar sales. In other words, since 1932 sugar beets have not been purchased at a pre-determined price, but rather at a rate based upon a relationship, with the risk of variation in sugar prices falling upon both processor and producer, but with special force upon growers, in the event of a ‘net return’ below $3.25 per bag.”

It was in this connection that headline news emphasis, in summarizing the report by Washington wire services, was given to the statement:

“In summary, it seems that the risks of price variation have, to a large extent, been shifted from processors, who formerly bore such risks through the guarantee of a minimum first payment, to the producer through the development of payment schedules under which the degree of grower participation in the risks of price change varies with each level of price.”

However, the report goes on to say:

“In any analysis of the current earning possibilities of processors’ consideration should be given to contractual changes which have been made during the interval under discussion. A table is appended hereto as Exhibit 6 comparing the schedules of payment in use in 1933 with those of 1938.”

And the report also makes the statement:

“Along these lines a change has recently been made under which grower participation is increased at higher levels of price.”
Increases to Growers Shown

MOREOVER, in printing the table of contractual changes between 1933 and 1938, showing substantial increases to growers, the report calls attention to the fact that in addition to the contractual changes shown, "the distribution of income from the sale of beet sugar has been altered because of the changes resulting from the excise tax and conditional payment structure now in effect." This redistribution, as previously shown in this article, resulted in a 56-44 percentage in favor of the grower on the basis of total payments in 1937, according to the report.

A table, Exhibit 6 in the report, shows changes in contractual price per ton of sugar beets 1933 and 1938. The table does not name specific companies, but shows contract changes by geographical districts. In lieu of printing the entire table, which shows sugar contents from 14 to 18 per cent, we take the following data, based on a 16 per cent and 14 per cent cossette test, in three general areas:

### Sixteen Per Cent Beet (Cossette Test)

<table>
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<tr>
<th>Where Contract Is Used for Sugar</th>
<th>Price Per Ton of Beets</th>
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<tr>
<td>Extensively 1933 1938 1933 1933 1938 1938</td>
<td>$4.39 $4.52 $4.75 $4.91 $5.10 $5.31</td>
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<tr>
<td>Utah and Idaho 4.13 4.18 4.45 4.69 4.77 5.29</td>
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<tr>
<td>Minnesota and Iowa 4.16 3.94 4.48 4.43 4.80 4.92</td>
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### Fourteen Per Cent Beet (Cossette Test)

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<tr>
<th>Where Contract Is Used for Sugar</th>
<th>Price Per Ton of Beets</th>
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<tr>
<td>Eastern Montana (G.W.) 3.71 3.90 4.03 4.25 4.38 4.59</td>
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<tr>
<td>Utah and Idaho 3.53 3.62 3.79 4.05 4.05 4.48</td>
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<tr>
<td>Minnesota and Iowa 3.64 3.41 3.92 3.85 4.20 4.29</td>
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The figures for Eastern Montana as shown above are the figures of the Billings-Lovell scale of The Great Western Sugar Company. The current Great Western scale in Colorado, Nebraska and Wheatland is the same scale translated to the individual sugar test basis. The Great Western scale in 1939 is the same as 1938, the only change in the basic contract being increased price protection to growers of low-content beets in Colorado, Nebraska and Wheatland.

The government's table shows two facts clearly:

First, substantial increases in favor of the grower have been made.

Second, The Great Western scale was higher in 1933, and is substantially higher today, at important price levels, than scales of other companies in Utah, Idaho, Minnesota and Iowa. It will be noted that with a 16 per cent beet and sugar netting $3.25, the
Great Western scale is 34 cents higher than the scales of Utah and Idaho, and 58 cents higher than in Minnesota and Iowa, substantial difference indeed.

It may further be stated that the Great Western scale is also higher than scales of companies in other than the four states named; and that while the scale of one other company using “stated extraction” contracts in the intermountain area approximates or equals the Great Western scale, no scale exceeds the Great Western scale.

The report is in seven sections: General economic factors in the beet sugar industry affecting the processor-grower relationship; recent trends in processor-grower contracts; distribution of income from sugar beets in recent periods; issues other than price involved in contracts; alternative principles for determining price of sugar beets; regional factors to be considered in arriving at a purchase and sale agreement; and types of contract for effectuating the participating principle.

European Countries Produce Much Higher Beet Population Per Acre Than Ours

EUROPEAN BEET growers space their beets more closely than we do in this country. This is made clear from Bulletin No. 102, entitled “Sugar Beet On The Continent,” published by the British government.

In Great Western territory a 100 per cent stand would amount to 26,136 beets per acre, on the basis of 12-inch spacing and 20 inches between rows. Call it 26,000 beets in round numbers.

Compare this 26,000 beets with 50,000 per acre in Czecho-Slovakia and over 60,000 in Poland! And it should be remembered that only a few Great Western farmers actually get as high as 26,000 beets per acre. In 1938, for example, only 312 farmers out of a total of 10,269, harvested 26,000 or more beets per acre. The average yield of these 312 farmers was 17.8 tons per acre.

THE BRITISH Bulletin points out that there is “of course, wide variation from one country to another, but in any one district there was relatively little difference of opinion on the subject, and only one instance was met—and that on very heavy-yielding land in Holland—where a theoretical stand of less than 30,000 plants to the acre was considered satisfactory.

“At the other end of the scale, plants were seen spaced to give 50,000 to the acre in Czecho-Slovakia and rather over 60,000 to the acre in one district in Poland. The variation between these limits appeared to be determined partly by climate and partly by the type of labor available. The most important climatic factor is probably the rainfall, and, when plotted, the approximate data collected suggests that the number of plants per acre and rainfall are inversely proportional to each other. Too much reliance must not be placed on this apparent correlation, for, as has already been mentioned, the cost of
labor also happens to follow rainfall closely.

"It would, however, be a fair conclusion to say that in the countries where the rainfall is less and the growing season shorter, growers believe that higher plant populations (from 40,000 to 60,000 plants per acre) are necessary and that, because labor is both plentiful and cheap, they are able to act in accordance with their belief. More important from our (the British) point of view is the fact that even in the wetter countries, where labor is more costly, they rarely aim at less than 30,000 plants per acre, while stands of from 32,000 to 36,000 are the more usual practice."

The Bulletin states the distance between rows in continental beet-growing countries ranges from about 16 to 18 inches. In Denmark the distance was slightly under 19 inches, and in Holland, less than 14 inches under some conditions.

Spacing between the plants in the row varied with row width and plant population. Beets were spaced about 6 inches apart in Poland and Czechoslovakia, and spacing varied in other countries up to about 10 inches in Scandinavia. In one case in Holland, beets were spaced 18 inches apart, but the rows were under 14 inches apart.

Last year in Great Western Territory, farm records for all districts showed that the average stand was about 70 per cent of what is considered a desired plant population, i.e., 100 beets per 100 feet of row. In other words, our farmers got 70 per cent of a theoretical stand; Czechoslovakia, 95 per cent; Poland, 86 per cent; Sweden, 91 per cent; Belgium, 88 per cent; Denmark, 92 per cent; and Northern France, 93 per cent.

Where cross-blocking is used in Germany, farmers plant as much as 50 pounds of seed per acre, according to the Bulletin. Continental growers use higher seed rates than in Great Britain, "which are helpful both in providing more plants in a given length of row and in overcoming to some extent any inaccuracy of the drill."

Uniformity of stand is emphasized in Europe. This is particularly noticeable in Sweden. "The Swedes, at any rate, appreciate that there can be no such thing as an optimum number of plants for a given area unless there is uniformity as well, and they are making definite efforts to secure it."

Very careful supervision of field labor is stressed. "It would appear to be an elementary principle of beet cultivation to insist on the minimum possible disturbance of the singled plants from which, after all, the crop will eventually be harvested."

"Practically everyone insisted that the best developed plant should be left and that the singled plants should be left upright after the work. In Slovakia they were so insistent on the latter point that the workers were made to press a little soil around each plant by hand," The Bulletin states.

George Ruff of Mitchell, Nebr., is one of Sterling's new landowners, since he purchased a part of one of the Swift Estate farms south of Sterling.
Where Doubt Changed to Enthusiasm

LAST year David Kreps, progressive farmer and beet grower of the Kuner district, secured the Dixie Cotton Chopper long enough to block five acres of beets.

At the time this work was being done, Mr. Kreps' labor contractor, Manuel Vasquez, who had worked for him for several years, didn't like the idea of using the blocking machine. However, after thinning the five acres blocked with the Cotton Chopper, the Vasquez family was very enthusiastic about the assistance given them by this machine. As a matter of fact, Mr. Kreps says that the mechanically blocked five acres were thinned in just half the number of hours per acre required on the remaining beets which were all hand blocked.

Furthermore, Mr. Kreps states that the growth of the mechanically blocked beets was not checked in the slightest degree by the thinning operation, while some acreage of his other beets became quite large before thinning was completed, and he feels positive that the difference in yield between the mechanically blocked five acres and remainder of his beet crop was fully seven tons per acre, which he attributes very largely to the difference in blocking and thinning.

Mr. Kreps this year has 42 acres of beets, all of which he intends to block mechanically if at all possible. His labor contractor, Manuel Vasquez, is still with him this year and is completely in agreement that the entire acreage should be mechanically blocked.

—Fred D. Law.

Watch the Soil

Be prepared to apply first irrigation before actual wilting begins!
Here Is Your Record for 1938!

This table shows average stand, average spacing between beets, and average tonnage per acre on 10,269 contracts in Colorado, Nebraska, Wyoming and Montana.

Notice how closer spacing gives higher tonnage per acre!

<table>
<thead>
<tr>
<th>No. of Beets per 100 Feet of Row</th>
<th>Avg. Spacing in Inches</th>
<th>—Number of Contracts—</th>
<th>—Per Cent of Total—</th>
<th>Tons Per Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-29</td>
<td>41 or more</td>
<td>50</td>
<td>0.5</td>
<td>4.5</td>
</tr>
<tr>
<td>30-39</td>
<td>31-40</td>
<td>154</td>
<td>1.5</td>
<td>6.8</td>
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<tr>
<td>40-49</td>
<td>25-30</td>
<td>448</td>
<td>4.4</td>
<td>9.3</td>
</tr>
<tr>
<td>50-59</td>
<td>20-24</td>
<td>1300</td>
<td>12.7</td>
<td>11.6</td>
</tr>
<tr>
<td>60-69</td>
<td>17-20</td>
<td>2295</td>
<td>22.3</td>
<td>13.5</td>
</tr>
<tr>
<td>70-79</td>
<td>15-17</td>
<td>2847</td>
<td>27.7</td>
<td>15.1</td>
</tr>
<tr>
<td>80-89</td>
<td>13-15</td>
<td>2032</td>
<td>19.8</td>
<td>16.1</td>
</tr>
<tr>
<td>90-99</td>
<td>12-13</td>
<td>831</td>
<td>8.1</td>
<td>16.7</td>
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<td>100 or more</td>
<td>12 or less</td>
<td>312</td>
<td>3.0</td>
<td>17.8</td>
</tr>
<tr>
<td>70.3</td>
<td>17</td>
<td>10269</td>
<td>100.0</td>
<td>14.78</td>
</tr>
</tbody>
</table>

Not only did closer spacing give higher yield per acre, but average sugar content in Colorado increased from 15% with wide spacing to 15.8 with close spacing, and in Nebraska average sugar content increased from 14.5% with wide spacing to 16% with close spacing.
Mechanical Blocking Has Come To Stay!

Here is a field of 34.13 acres being blocked to 10-inch spacing with a 4-row blocker May 22, on the factory farm at Sterling.

The same field June 7—sixteen days later. Frequent rains delayed the hand workers, so that thinning could not be completed until almost three weeks after the beets had been blocked. But the beets are sturdy, healthy and unhurt.

Here's the result, October 11: Timely mechanical blocking gave as near a perfect stand as you could ask for. The hand workers were helped rather than hindered, and the average yield was 20.72 tons per acre!
Substantial Reduction in Company Earnings

Earnings of The Great Western Sugar Company were reduced by more than 23 million dollars in 1938 and earnings per share of common stock were reduced by more than one-half as compared with the previous year, according to the annual report issued April 24.

Net profit of $3,699,405.95 was reported for the Company and its subsidiaries for the fiscal year ending February 28, 1939, as compared with $6,596,165.02 for the previous year, a reduction of $2,896,759. Profit for 1938 was the lowest since 1932.

The 1938 earning was equivalent to $1.47 per share of common stock, as compared with $3.08 the previous year.

Regarding the fiscal year under review, Frank A. Kemp, president, stated:

"From the start of the year, sugar prices declined until September, and the price level reached in that month has not improved to date on any substantial amount of deliveries. The average net return for all sugar sold by the Company since August is lower than for any like period in the Company's history. The low sugar returns made for reduced prices to growers on the 1938 crop, and up to the present time have permitted only the initial payment, which totaled $13,099,582. The Bureau of Labor Statistics of the United States Department of Labor reports the average retail price of sugar in the United States in 1938 as 5.3 cents per pound. This price, while reflecting the substantial excise tax of .535 cents per pound, was very little above the reported average retail price for 1932 of 5.1 cents per pound without tax, which was the lowest annual average price in the history of the country. The low price level has intensified competition among sellers of sugar."

Mr. Kemp commented on acreage, sugar output and the trend toward higher yields of beets per acre, as follows:

"A smaller acreage was harvested than in 1937, but the yield of beets was excellent and total tonnage purchased was 9.1 per cent greater. An average yield of 15.28 tons per acre was harvested from nearly 175,000 acres in the Colorado and Nebraska districts. The ten-year moving average of beet yields has definitely increased for the territory in which the Company operates. In light of current discussions regarding declining soil fertility and productivity in many sections of the nation, this actual increase in yield over earlier years is a practical tribute to the high value of the farming system built on rotation of sugar beets, feeding beet by-products to live stock on the farm, and the conservation and application of substantial quantities of fertilizer produced. The sugar content of the 1938 crop was about one-half per cent in polarization below average. Total output of sugar was 921,741,100 pounds, an increase of 7.8 per cent over the preceding year."

In the Ovid district, John Leehman, East Factory; Harry Spillman, Julesburg; Leslie Kimberly, Big Springs, and Goldie Forney, Brule, were among the first growers in their respective districts to plant beets this spring. All of these growers completed planting on their entire acreages early.
Bill Wailes, 18-year-old Milliken 4-H club member, son of Mr. and Mrs. Leroy Wailes, was notified by the Holstein Fresian association of America as Colorado champion of boy Holstein breeders.

As a result of this honor Bill becomes a candidate for the honor of national champion Holstein breeder among 4-H club members.

Thinners started to work on Clarence E. Johnson's place, May 6. He has a patch of 17 acres which was in peas last year that gives excellent promise. He has just recently acquired a Farmall with cultivator attachments with which he expects to do all his cultivating. He has 135 acres of row crops this year. Mr. Johnson is in the Plumb district of the Longmont factory.

Fred Luft has just completed a new, two-room labor house, one of the best in the Sterling district.

J. P. Mullowney, father of Tom Mullowney, fieldman on the Huntley project, Montana, and Ed and Tim Mullowney, beet growers west of Billings, passed away May 6 after an extended illness. Mr. Mullowney was a beet grower for many years in the Rocky Ford, Colorado, district, before coming to Billings in 1911. He was an extensive beet grower and feeder and took a prominent part in all farmer activities.

Mary Franz, daughter of Mr. and Mrs. Louis Franz of the Harmony district south of Fort Collins, has recently been awarded a scholarship by the Union Pacific railroad for her outstanding leadership and ability in 4-H club and community activities. This is not the first time Mary has been honored for outstanding work; having won two state championships in home furnishings; one in canning and one in home economics judging.

When Does the Irrigation Season Begin?

In the old days they used to start irrigating beets around the fourth of July. We now know that was much too late for most years. And they used to think that small beets could not be irrigated. Now we know better.

According to Asa C. Maxson, in charge of the Longmont Experiment station, "sugar beets should be irrigated whenever they need water, regardless of age, size, or calendar date."

Many times, he points out, small beets need water earlier than late ones. The root of the small beet is shorter and less widely spread; consequently if soil moisture is not sufficient in the upper 8 or 10 inches of soil, the small beets will suffer. Moreover the soil is less shaded and soil temperatures are higher, resulting in rapid loss of moisture.
during her seven years of 4-H club work.

Fred L. Smith, East Factory station, Ovid, spent his spare time last winter revamping his beet drill to plant single seed balls.

Howard Bills cross-blocked his beets with a tractor and duck feet.

Howard Bills, Windsor district, has been doing most of his beet cultivating the past year or two with a small John Deere tractor. This worked so well for cultivating that he thought it also should work for mechanical blocking. Howard arranged a set of Loveland-made duck feet on the tractor bar and did a very fine job of cross-blocking. Thirteen seven-inch duck feet were used in the assembly. A good marker made it unnecessary to retrace the mark of the outside duck foot and an accurate and speedy job resulted.

Henry Fritzler, Windsor, and his family were trying to thin more beets last spring than time would permit so they sought the aid of the mechanical blocker. Mr. Fritzler found that he could block a few acres each morning and thus leave the ground soft and mellow for the thinners. They liked this method better than where they were blocking too far ahead of the thinners. However, the beets were small and were not suffering from need of thinning.

The engagement of Miss Wanda Marie Smolski, home economics teacher in the Wellington high school, and Mr. Donald Dalby, popular Wellington farmer, was recently announced. Mr. Dalby is operating his father's farm this year while the elder Mr. Dalby directs the welfare bureau of Larimer county.

H. C. Meier of the Owasco station, and John Burbach of Kimball, in the Gering district, have each purchased a set of the Loveland cut-away duck feet. After watching their neighbors last year cross-cultivate with these duck feet, they were convinced that cross cultivation is a good cultural practice and a labor saver.

Alvin Sowder, Ovid; L. R. Morley, Ben Franklin and R. E. Counce, Julesburg; W. G. Wilder, F. R. Anderson and H. B. Skoglund, Big Springs, and J. L. Brown, Brule, have all had cattle on the market during the past month.

W. A. Dickens of the Longmont factory district has purchased a tractor planter and cultivator attachment for his new tractor. He expects to be able to better handle the 43 acres of beets with this equipment.

The Alexander Hettingers of Atwood, Sterling district, lost the large part of their washing and their washing machine May 2 when the wash house burned. The neighbors gathered quickly and, there being no wind, prevented loss of other buildings.
The two pictures at the left show Elmer Glantz's home-made manure loader and at the right is the commercial loader of U. S. Ward at Pine Bluff.

Pine Bluff, Wyoming, growers load manure the quick and easy way. Elmer Glantz made his loader out of used iron and old implement parts. U. S. Ward is using a commercial loader. Both of the growers are well pleased with their machines and say that they take the "sore back" out of applying manure to their beet land. The loaders are attached to a tractor and operate best in manure that is not frozen but will also handle frozen manure successfully. Under good conditions the loader will keep three spreaders in operation. They handle from 400 to 600 pounds of manure at a time. The growers plan to use their loaders for other loading and lifting jobs on their farms.

Leon Sian of Bull Mountain station, Montana, purchased this spring from Mrs. Violet Engle, her eighty-acre farm. This makes Leon a dandy spread of one hundred and sixty acres. Leon came to this district twenty years ago as a beet worker.

Ramon Cardenas of Hambert station, Greeley district, former beet field worker, has been farming cooperatively with Ray G. Meyer, landowner, for twelve years. Mr. Cardenas has 54 acres of beets this year and will again, as usual, do all of the labor with very little, if any, outside help.

Mrs. Nannie G. Clark has moved back to the farm in the Sunnyside district after making her home in Berthoud for 30 years. Mrs. Clark and her son, John, are farming their 240-acre farm and have 52 acres of beets this year.

Grant Hartman, Morey station, Longmont, started thinning on his 30 acres of beets on fall-plowed ground May 8.

Carl Maurer has placed on feed in his feedlots west of Sterling, 110-head of large, three-year-old steers for summer feedings.

Lee Johnson, successful farmer of East La Salle in the Greeley district, is cooperating with Jesse Greene of the Anaconda Sales Company in conducting field experiments with phosphate this season in addition to using 2,000 pounds on a portion of his 24 acres of beets. Mr. Johnson is alert in keeping up the fertility of his farm soil.

E. W. Coombs of Spurling, Montana, had good labor last year, yet he says he got a better stand from cross-blocking than the labor left, and will
cross-block this year if the conditions are right, even though he does not have a full stand of beets.

Mrs. H. C. Brashear, pioneer of western Nebraska, recently died. Mrs. Brashear was a resident of Mitchell valley for 53 years.

It looks like old times around the Berthoud district this year as there will be about 1,500 acres of beets at this dump this year as compared with 950 acres in 1938. The water situation in this territory is excellent for 1939.

State Champion Waverly Girls—And Their Sungold Trophy!

Here are the 1939 Basketball Champions of Colorado, the team of the Waverly high school—and people up Fort Collins way are mighty proud of them! Front row: Eldina Deines, Alice Wells, Maxine Head, Rufina Meyer, Arlene Keller and Elizabeth Hosier; second row, Shirley McIntyre, Della May McIntyre, Loretta Demuth, coach; Zelma Murch, manager; Betty Nockold and Reta Prather.

Beet growers families are represented by Miss Deines, daughter of George C. Deines; Miss Meyer, daughter of George Meyer, and Miss Hosier, daughter of L. Hosier. Miss Wells is daughter of Lee Wells, weigher at Wellington dump many years. Misses Meyer, Wells and Head were chosen for the All-Colorado team.

104
W. G. Markham, Anton E. Hanson, Jim Huleatt, H. W. Hansen and Julius Bockwoldt have very good winter wheat in the Twin Mounds dry land district.

Henry Lind III did a nice job of cross-blocking at Severance last year.

In order that their own family might thin more of their own beets last spring Henry Lind III, son of Henry Lind, Jr., at Severance, Colo., talked his father into trying a mechanical blocker in one of the fields. A set of eleven duck feet on a cultivator did a very good job of blocking when the beets were small and helped the family speed up their work. This field was one of Windsor's outstanding beet fields throughout the summer, and the Linds harvested one of their best beet crops with a minimum of labor expense.

Lorraine Fahrenbruch, daughter of John Fahrenbruch, Jr., attained a creditable standing in the recent spelling contest at the Boxelder school. Next year we hope to see Lorraine in the state finals.

Charles B. Barbour is experimenting with corn by planting twenty different varieties of hybrid seed. Mr. Barbour lives just west of Scottsbluff.

Jake Van Dyke of Ovid is one of the 1938 winners of a $100 Union Pacific scholarship offered to outstanding 4-H club boys of Colorado.

Albert Reichert at Buda dump Loveland, expected to be thinning beets by the 15th of May. The beets were planted on fall plowed land and fall plowing shows up exceptionally well this year due to the late spring.

Ray Reynolds' farm, northwest of Longmont, has a beautiful stand of beets, planted April 5.

Joe Ruff, who lives on the William Beers farm near the Fee dump, Montana, has moved his entire set of farm buildings from the river bank to a much improved site near the main U. S. highway No. 10.

Peter J. Wolf at Buda dump, Loveland, shipped his steers, which made a good gain and they were good property. Pete is very well satisfied with results.

Jake Bott, who formerly farmed near Wellington, has rented the John Currie farm near Plummer school.

Another landmark in the Loveland territory is gone. The 10-acre apple orchard which the Litle family planted 44 years ago has been pulled out and the land will be planted to corn.

H. C. Uyemura recently purchased the C. B. McKinstry farm near Sedgwick, Colo., and is planning an up-to-date country home.

John Stugart of Greeley has bought the 80 acres in the river bottoms south of Loveland which formerly be-
longed to the Trindle Estate. He has had a dragline digging a drainage ditch and is planting beets. It looks as though this property, which has been considered waste land for many years, would be reclaimed and made into a profitable farm.

Leo Steensma of Kuner, Greeley district, following successful cattle feeding operations during the past winter, has already contracted for his feeder cattle for next fall. High crop yields, following consistent manuring practice, are Mr. Steensma’s confident expectation.

Miss Elizabeth Reichert and Judie Wambolt, both of Gering, were recently married. A wedding dinner at the American Legion hall followed the ceremony. Approximately 250 guests attended.

W. A. Neighbors has moved from the C. O. Van Note farm west of Longmont to the Ludlow farm, formerly farmed by Arthur Van Thuyne, south of Longmont.

Adam Happal, on one of the Haley-Smith farms, is shown phosphating 30 acres of his beet land. Adam is also cooperating with the Sugar Company in conducting an experimental phosphate test to measure its effect on the sugar beet crop.

The gravel pits on the T. R. Norcross farm at Loveland are supplying material to eight federal building projects in Northern Colorado at the present time.

Matt Brown of Belfry, Montana, is fattening a bunch of cattle this summer, which he expects to have ready for the early fall market.

H. H. and J. C. Uhrich have bought the farm long owned by George Uhrich at Kelim, Loveland district. H. H. Uhrich is operating the place now.

Ralph Bishop, who formerly was a grower in the Timnath district, is farming for Alex Nelson in the Cactus Hill district.

Mr. and Mrs. W. D. Hampton and son Joel, farmers south of Gering, are on an extended trip. They were to see the Kentucky Derby, and from there go to New Orleans and back up to the New York World’s fair. They have their own trailer house and expect to be gone until about July 15.

Henry Kitzman of Kuner, Greeley district, believes in keeping his beet labor satisfied and residing on the farm the year around. He has had his present labor, the Raymond Garcia family, for several years and preparations are, as usual, being made by the Garcia family for a large productive vegetable garden.

Edward Frazier, well-known farmer in the Fife district southeast of Berthoud, purchased the Culver place southwest of Berthoud consisting of 400 acres, which formerly was used as a horse range. Mr. Frazier is using his well-established farm practices in building up this large tract with alfalfa and is sowing quite a large number of acres into new alfalfa without a nurse crop. He intends to raise sugar beets next year.
Fred Law, Greeley Fieldman, takes a look at the excellent job of ridge planting on the 110-acre contract of Brethever Brothers, Kuner.

Jake B. William and Fred Brethever of Kuner are large-acreage and high-yield beet growers. They get their work done on time and in the proper manner. Their 110 acres of beets were ridge planted for more effective irrigation of the comparatively heavy flat land, and promptly irrigated for germination with no loss of time waiting for delayed rains.

Lewis Breeden has been under medical care recently. Mr. Breeden lives northwest of the Marlin beet dump in the Scottsbluff district.

Pete Corsentino, formerly of Brighton territory, has bought and is farming the place formerly owned by the Kistler Stationery Company, northeast of Niwot. He is making extensive improvements.

Fiedalus Bollig of East LaSalle has used a special single seed dropper beet drill, together with his regular drill, on two different portions of his beet acreage in order to secure a comparison of germination stands from the two methods of planting on both fall and spring plowed land.
R. G. Pyle and two of his sons, Raymond and Denzel, have beet contracts totaling 15 1/2 acres at Sterling. They own one of the first mechanical manure loaders in the district and have just purchased a six-row tractor planter and cultivator. They are all set for a big tonnage.

D. E. (Doc.) Cole, a prominent farmer and beet raiser of Sanders, Montana, has bought and sold horses as a side line for many years. The increase in the use of farm tractors has put a crimp in the horse business, so Mr. Cole has recently taken up the buying and selling of cattle as a side line. Some of these cattle he carries over in hill pastures adjoining his farm.

Don Foote, a retired merchant, who owns a number of farms around Loveland, is busily engaged in beautifying his farms by planting shade trees and shrubs.

William H. Roberts, after farming for a year in the Longmont territory, has returned to the farm which he and his father had in 1936-37, and is growing 75 acres of beets this year.

The sheep and cattle feeders around Scottsbluff are wearing smiles this spring. In addition to having a good supply of fertilizer for their beet fields, they have money in their pockets.

Henry Horst is the possessor of an 80-acre farm west of Berthoud formerly occupied by J. Frank. Mr. Horst is doing a good job of getting this farm in shape.
Blocking Without Thinning

**They Believe in Experimenting**

FERAUDO, left, and his son, Hector, farming near Sterling, Colorado, have tested the result of blocking beets without thinning, on the yield and sugar content, for the past two years. They have averaged 17.70 tons per acre yield and 15.88 per cent sugar on the unthinned beets as against a yield of 18.70 tons per acre and a sugar content of 15.34 per cent from the thinned plots.

Charles B. Barbour of Scottsbluff was a member of a party of western Nebraska Certified Potato growers who made a good will tour of the southern potato country. The south plants lots of Nebraska certified spuds.

George Kiehn of Loveland has this to say about working cross-blocked beets: "Last spring was the first time I worked cross-blocked beets. I know that it saved me labor. But at the same time the stand was more even and the tonnage better. I think cross-blocking does good work when the ground is in good condition. I would much rather work the beets cross-blocked than to block them with the hoe."
Carl saved time and money for both himself and his labor by using a blocker when the beets were growing fast.

Grew Too Fast—But He Caught Them

CARL FRITZLER, Windsor, had some fine beets last year and some very good beet help. But the beets grew too rapidly for the help. Carl didn't want to penalize the beet help by getting extra labor to do the work they had figured on themselves, and at the same time he did not want to suffer a loss, so a cultivator with tools for cross-blocking was put to work. The result was favorable for both parties for the beets were handled in plenty of time by the original labor.

Mrs. R. C. Croissant, wife of a prominent young farmer and beet grower of Hardin, Greeley district, recently had the exciting experience of recognizing two young men who called at the farm residence for drinking water, as the Ohio bandits, Kenneth and Cletus Mossman. Immediately after the departure of the bandits, Mrs. Croissant called Sheriff Anderson, who arrested the men within a few hours.

Variety tests of beet seed have been conducted in the Billings district for a number of years at the Huntley experiment station under the supervision of Dan Hansen. This year even more extensive experiments are being conducted by Mr. Hansen on the experiment farm. In addition to this, complete variety tests have been planted on the John Waddell farm west of Billings and on the Great Western Sugar Company farm near Fromberg.
HOT weather ahead!
That is the signal for every farmer to watch his soil and be ready to irrigate.

Irrigation studies on the 1938 crop proved again what had been demonstrated in previous years, namely that "early" irrigation produced higher yields per acre than "late" irrigation; and that the tonnage per acre increased with the number of irrigations.

For Company territory as a whole, farmers who irrigated two times averaged 10.93 tons per acre; three times, 13.0 tons per acre; four times, 13.99 tons per acre; five times, 14.52 tons per acre; and six or more times, 15 tons per acre.

Colorado farmers who started first irrigation before July 1 averaged 16 tons per acre. Those who started first irrigation between July 1 and 10 averaged 14.36 tons; and those who started after July 10 averaged 12.38 tons.

In Nebraska also the advantage of starting the first irrigation early was demonstrated. Farmers who started before July 1 averaged 15.55 tons per acre. Those who started between July 1 and 10 averaged 15.10 tons; and those who started after July 10 averaged 14.07 tons per acre.
# Table of Contents

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crop Management Will Tell the Story!</td>
<td>79</td>
</tr>
<tr>
<td>Securing Satisfactory Stand of Beets—Dr. H. E. Brewbaker</td>
<td>81</td>
</tr>
<tr>
<td>&quot;C&quot; Molasses Proved More Profitable Than Cane</td>
<td>84</td>
</tr>
<tr>
<td>Gardens! Gardens! Gardens!</td>
<td>84</td>
</tr>
<tr>
<td>Report on Processor-Grower Relations</td>
<td>87</td>
</tr>
<tr>
<td>European Countries Produce Much Higher Beet Population Per Acre Than Ours</td>
<td>94</td>
</tr>
<tr>
<td>Where Doubt Changed to Enthusiasm</td>
<td>96</td>
</tr>
<tr>
<td>Here Is Your Record for 1938!</td>
<td>97</td>
</tr>
<tr>
<td>Mechanical Blocking Has Come to Stay!</td>
<td>99</td>
</tr>
<tr>
<td>Substantial Reduction in Company Earnings</td>
<td>100</td>
</tr>
<tr>
<td>Around the Territory</td>
<td>101</td>
</tr>
<tr>
<td>Getting the Jump on Hot Weather!</td>
<td>111</td>
</tr>
</tbody>
</table>

The Great Western Sugar Co., Longmont, Colorado
Fall Plowed—Irrigated Up—20.37 Tons Per Acre

This striking photograph was made in 1937 on the farm of M. O. Dunn, Sterling. Here was a difference of 3.35 tons per acre in favor of fall plowing, and in this case the sugar content was also .52 per cent higher on the fall plowed land. This year many farmers were caught with late spring plowing, poor seed beds, poor germination and poor stands. They don't intend to let this happen again. "Fall Plow for '40!" is their slogan.

JULY, 1939

THE GREAT WESTERN SUGAR CO.
SKIES overhead may be rainless, but for the farmer with a good well, the sky is upside down. There's plenty of rain stored in the earth. He can draw on the underground supply when he wants it.

One manager writes: "We estimate that 60 percent of our beet crop can be reached by pumping plants." This is real crop insurance in a region like ours where an adequate water supply is so essential.
Resourcefulness to Be Commended

BEET farmers are to be congratulated on the resourcefulness with which they are growing the present crop.

Farm management has been put to the test by the particular conditions encountered this year, and farmers are meeting that test.

Those who fall plowed last year were able to get the crop in on time and take advantage of spring soil moisture for germination.

Others, confronted by hot, dry weather, irrigated up. A splendid record of irrigating for germination was made. Many farmers who had never irrigated for germination before did it promptly this year.

And gone are the old days when beet growers waited until "along about the fourth of July" to apply first irrigation. This year, regardless of the calendar, farmers have been applying water to the beets when they needed it. This is real progress.

Very striking this year is the contrast between beet growth to date on fall plowed and late spring plowed land. On all sides you can hear farmers saying that they don't intend to get caught again with late spring plowing if they can possibly help it.

Many will remember for a long time the particular difficulties in doing late field work this spring. Fields too muddy and wet to work caused delays. Many seed beds could not be properly handled. Germination on such fields was delayed and uneven. Cool wet weather changed suddenly to prolonged dry weather with hot and damaging winds.

This experience indicates that this will be a banner year for fall plowing. Farmers will plan their work to get into the fields early with disks and plows. Where shocks of grain are set in straight rows, it will be possible to run the disk between the shocks.

With the exception of light soils that blow, fall plowing is generally recommended. Unfavorable results after fall plowing usually mean that the job was not done right under right conditions. The soil should be partially worked down. In this dry climate it is usually a mistake to leave fall plowed land in a rough, cloddy condition.

To continue timely irrigation on the present crop, and to keep pushing the crop toward satisfactory yields, will go hand in hand with preparing the land for 1940.
WHAT can be learned from irrigation practices of 1938? A study of farm records in all Great Western Sugar Company territory showed:

1. That tonnage per acre increased as the number of irrigations increased.
2. That irrigation starting early gave the highest yield per acre.
3. That, in this particular year, no very definite conclusions could be drawn from studies trying to determine the effect on sugar content of either frequency of irrigation or date of first irrigation.

Irrigation studies hold good for the year and conditions under which they were made. Another year, conditions may be different. However, regarding frequency of irrigations, the study of 1938 growers' records confirms the findings of previous years and clearly indicates that in most instances, the greater the number of irrigations, the higher the yield in tons per acre.

TAKING Company territory as a whole—Colorado, Nebraska, Wyoming and Montana—it is interesting to note the number of times various growers irrigated their beets. The record shows:

That 26 growers irrigated only once.
That 183 growers irrigated twice.
That 1,092 growers irrigated three times.
That 2,812 growers irrigated four times.
That 3,172 growers irrigated five times. This was the largest

"Giddap Napoleon!" Says Ed to His Tractor.

Ed Jacoby doesn't feed his tractor hay, but when he was short of help this spring our photographer snapped him riding the float and driving a caterpillar 20 tractor with lines. Ed is farming the Art Wailes place north of Johnstown. He got his spring work done in good season and has a beautiful field of beets growing on his land this year.
numerical group, representing 31.1 per cent of the total number of growers recorded.

That 1,875 growers irrigated six times.
That 727 growers irrigated seven times.
That 248 growers irrigated eight times.
That 58 growers irrigated nine times.
That 10 growers irrigated ten times.
That 3 growers irrigated eleven times.
That one grower irrigated twelve times.

The following table shows how yields of beets per acre increased with frequency of irrigation:

<table>
<thead>
<tr>
<th>Number of Irrigations and Yields—1938</th>
<th>Average Tonnage per Acre on Contracts Irrigated:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 Time</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Eaton</td>
<td>3.79</td>
</tr>
<tr>
<td>Windsor</td>
<td>9.38</td>
</tr>
<tr>
<td>Fort Collins</td>
<td>12.16</td>
</tr>
<tr>
<td>Loveland</td>
<td>5.86</td>
</tr>
<tr>
<td>Longmont</td>
<td>15.60</td>
</tr>
<tr>
<td>Brighton</td>
<td>10.07</td>
</tr>
<tr>
<td>Fort Lupton</td>
<td>15.22</td>
</tr>
<tr>
<td>Colo. Dist.</td>
<td>11.84</td>
</tr>
<tr>
<td>Scottsbluff</td>
<td>18.54</td>
</tr>
<tr>
<td>Gering</td>
<td>18.72</td>
</tr>
<tr>
<td>Bayard</td>
<td>8.40</td>
</tr>
<tr>
<td>Minatare</td>
<td>13.16</td>
</tr>
<tr>
<td>Mitchell</td>
<td>2.06</td>
</tr>
<tr>
<td>Lyman</td>
<td>13.16</td>
</tr>
<tr>
<td>Wheatland</td>
<td>10.73</td>
</tr>
<tr>
<td>Billings</td>
<td>8.38</td>
</tr>
<tr>
<td>Lovell</td>
<td></td>
</tr>
<tr>
<td>Mont. Dist.</td>
<td>8.38</td>
</tr>
<tr>
<td>Total GWS Co.</td>
<td>11.85</td>
</tr>
</tbody>
</table>
LAST year it paid to start first irrigation before July 1. Colorado farmers apparently got the jump on their neighbors in Nebraska, according to the figures which show that 2,594 Colorado farmers, as compared with 39 in Nebraska, started applying water before July 1 to their beets.

The following table shows how the date of first irrigation affected tonnage in the Colorado district, with the early birds beating the slow starters by more than 3 1/2 tons per acre.

<table>
<thead>
<tr>
<th>Number of Contracts—First Irrigation Started</th>
<th>Average Yield Per Acre—First Irrigation Started</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before July 1</td>
<td>July 1-10</td>
</tr>
<tr>
<td>Eaton ..........</td>
<td>385</td>
</tr>
<tr>
<td>Greeley ........</td>
<td>333</td>
</tr>
<tr>
<td>Windsor ..........</td>
<td>306</td>
</tr>
<tr>
<td>Fort Collins ...</td>
<td>94</td>
</tr>
<tr>
<td>Loveland .......</td>
<td>254</td>
</tr>
<tr>
<td>Longmont ........</td>
<td>457</td>
</tr>
<tr>
<td>Brighton ........</td>
<td>176</td>
</tr>
<tr>
<td>Fort Lupton ......</td>
<td>81</td>
</tr>
<tr>
<td>Ovid ...........</td>
<td>85</td>
</tr>
<tr>
<td>Sterling .......</td>
<td>85</td>
</tr>
<tr>
<td>Brush ...........</td>
<td>170</td>
</tr>
<tr>
<td>Fort Morgan ......</td>
<td>168</td>
</tr>
<tr>
<td>Colo. Dist. ....</td>
<td>2594</td>
</tr>
</tbody>
</table>

As previously stated, only 39 Nebraska-Wheatland farmers started irrigating their beets in the “early” period, meaning before July 1, last year. This number is hardly enough to be used as the basis for a significant statistical comparison. However, Nebraska-Wheatland farmers who started between July 1 and 10 harvested about one ton per acre more than those who waited until after July 10 to start watering their beets. This is shown by the following table:

Average Yield Per Acre—First Irrigation Started:

<table>
<thead>
<tr>
<th>Nebr. Dist. ..........</th>
<th>15.10</th>
<th>14.07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scottsbluff ..........</td>
<td>15.59</td>
<td>14.63</td>
</tr>
<tr>
<td>Gering ...............</td>
<td>18.11</td>
<td>16.23</td>
</tr>
<tr>
<td>Bayard ...............</td>
<td>15.13</td>
<td>13.39</td>
</tr>
<tr>
<td>Minatare .............</td>
<td>16.16</td>
<td>13.59</td>
</tr>
<tr>
<td>Mitchell .............</td>
<td>13.71</td>
<td>13.94</td>
</tr>
<tr>
<td>Lyman ...............</td>
<td>16.08</td>
<td>15.04</td>
</tr>
<tr>
<td>Wheatland ............</td>
<td>11.67</td>
<td>9.47</td>
</tr>
</tbody>
</table>
In the foregoing table 1,159 Nebraska-Wheatland contracts were in the July 1-10 group, and 1,269 contracts in the group starting irrigation after July 10.

The same trend in favor of starting first irrigation early last year was noted in the Billings-Lovell district. In this area 504 farmers started first irrigation before July 1 and averaged 13.17 tons per acre, while 1,399 started after July 1 and averaged 12.04 tons per acre. In other words, here again the difference was slightly more than one ton in favor of earlier application of water.

**Putting Sugar Beets On Special Diet**

R. J. Brown and one of his pots of beets grown in coarse sand with a carefully controlled liquid diet.

THE Research Department of The Great Western Sugar Company is now doing preliminary experimental work designed to help answer questions of this character:

How far may manure be replaced by commercial fertilizer in growing a crop of sugar beets?

What plant foods stimulate top growth and what foods stimulate root growth?

How do variations in levels of various plant food elements affect sugar content?

In the preliminary work the beets are being grown in pots in a greenhouse. The beets are grown in coarse sand watered with culture solutions in which the quantities of plant food elements are carefully controlled.

The effects of changes in ratios of the different elements may be determined by making the desired changes in the culture solutions. The present investigations are largely concerned with testing the effects of different forms of nitrogen. The beets grow rapidly in the sand cultures and the effects produced by the different food elements are very noticeable, according to R. J. Brown, who is conducting the experiment.

Jessee Holiday and son Harve, Stegall station, Lyman, had their three contracts all thinned by June 6.

Peter Reib, prominent Scottsbluff farmer and stockman, recently passed away.
Albert Reitz, right, holding one of his lath pipes and showing how they work like faucets through the ditch bank. This method enabled him to apply water uniformly on the steep slope shown above.
Lath, Shingle Nails—and Controlled Irrigation

WHEN you talk about putting the right amount of water into the soil at the right time, some fellows say: “Yes, but how do I do it?”

Not Albert Reitz, however. He studies the soil, the size of the beets, the slope of the land, and writes the proper prescription.

The pictures on the opposite page show the problem he was confronted with this year and how he met it. Here’s the problem: the slope of the land was rather steep. Part of the seed had not germinated. Part had germinated. Water—just the right amount, evenly distributed—was necessary for the dry seed and the tender plants which were in danger because of hot weather and dry wind.

Mr. Reitz ran one head of water along the top of the steep hillside, and permitted the water to run to the rows through wooden pipes he made himself. Each pipe is simply four ordinary plastering laths nailed together. This gave an even distribution of water, without washing the soil or wasting the water.

The photographs were taken during a heavy windstorm that swept the Sterling district June 9, but life-giving moisture was reaching the tender beets in time to keep them growing.

Wasting Water Is Wasting Fertility

WASTING water is wasting ferti-

lity!”

That is a fundamental concept which should be kept in mind by every farmer, according to L. H. Mitchell, field supervisor of operation and maintenance, U. S. Bureau of Reclamation.

Water must be paid for, but even assuming that water were free as air, it must be remembered that if a farmer puts more water on his land than the crops can use, the excess water will carry away with it valuable plant foods, according to Mr. Mitchell.

Mr. Mitchell has prepared an il-
lustrated booklet “Practical Use of Soil and Water,” to be made available by the Reclamation Service for use in extension programs promoting more efficient use of water.

The text of the booklet constitutes a lecture and the illustrations have been made into 53 colored slides showing various aspects of irrigation and water requirements of alfalfa, oats, sugar beets and potatoes.

Mr. Mitchell has studied various devices and methods for determining the wilting point of soils and proper timing of applying water to crops. He says that a very successful practical method involves simply going to the blacksmith and getting a solid round steel rod one-half inch in diameter and four feet long. A T-shaped handle can be welded across the top. This is a soil probe.

The farmer pushes the probe into his soil and learns to “calibrate his
sense of touch.” The probe moves easily through moist soil and meets resistance when the soil is dry. By digging a hole with a spade, the farmer can check on his own findings until he becomes familiar enough with the use of the tool to use it successfully on his particular kind of soil, according to Mr. Mitchell.

Graduated from the University of Maine in 1905, Mr. Mitchell went to Montana in 1905, where he spent 18 years on the Lower Yellowstone project. His government experience also included work on the Riverton and Shoshone projects before being called to Washington on his present work.

“I had occasion to observe closely the development of the Lower Yellowstone project, having been there eighteen years of which I was project manager for twelve years. Water has been available there for thirty years and it has been demonstrated clearly that sugar beets are the backbone of the project,” he said.

**Test Shows Higher Yield With Less Water When Shorter Runs Are Used**

H. E. GRAVES, a farmer near Fort Morgan, has shown how irrigation water can be saved by regulating the length of furrows to correspond to the rate at which water will penetrate the soil.

He divided his corn field so that one part of it had rows 80 rods long and the other part had rows of corn 40 rods in length. He did this by digging a ditch half way through the field.

Each part of the field was irrigated alike, except for the distance the water had to flow, according to R. E. Cannon, Morgan County agent, and Floyd D. Brown, specialist in irrigation practice for Colorado State College extension service, who cooperated with Graves in this demonstration. A record was kept showing the number of hours it took to irrigate each part of the field with water pumped from a well. Three irrigations were given during the past season.

Graves found it was necessary to apply 29 acre-inches of water per acre when he irrigated the 80-rod-long rows of corn, but only 18 acre-inches were required for the rows 40 rods long. In other words, 11 acre-inches or nearly an acre-foot of water was saved per acre by using the 40-rod rows instead of the rows twice that long.

The rows 40 rods long produced an average of 78.83 bushels of corn per acre, or 8 bushels more than the long rows. Soil samples taken during the growing season showed more moisture in the short rows than in the longer ones. The soil on which the demonstration was conducted is a deep, sandy loam and is representative of much of the best irrigated land in this region.

This demonstration shows that where water must flow over land for long distances, a great amount of water is lost by over-irrigating the upper ends of the field before the lower area receives enough moisture. By a little experimenting a farmer can determine how far he should run irrigation water on his land for best results, says Brown.
Fall Plowing Paid Last Year

Fall plowing paid last year.

Growers' records show that in all Great Western territory, Colorado, Nebraska, Montana and Wyoming, there were 1242 contracts on which the entire acreage for the 1938 crop had been fall plowed the previous year. Fully one-fifth of the harvested acreage was fall plowed.

More land was actually fall plowed than these figures show because the method used in making the study does not attempt to include farms on which part of the land was fall plowed and part plowed in the spring.

The Colorado and Billings districts showed the best record for fall plowing. Colorado had 658 contracts entirely fall plowed and Billings 498. In the Nebraska district only 15 contracts were entirely fall plowed, which is hardly enough to make a significant statistical comparison. In the following table the same is true of the Fort Collins district, which showed only five contracts entirely fall plowed. The average yield of these five contracts happens to be lower than the general Fort Collins average, but a comparison based on such a small number does not mean very much, one way or the other.

Here is the record for the Colorado and Billings districts:

<table>
<thead>
<tr>
<th>Number of Contracts Entirely Fall Plowed</th>
<th>Average Fall Plowed Land Yield</th>
<th>Average Other Contracts Yield</th>
<th>Increase In Favor of Fall Plowing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eaton</td>
<td>15</td>
<td>20.76</td>
<td>17.08</td>
</tr>
<tr>
<td>Greeley</td>
<td>28</td>
<td>15.85</td>
<td>14.84</td>
</tr>
<tr>
<td>Windsor</td>
<td>15</td>
<td>16.74</td>
<td>16.28</td>
</tr>
<tr>
<td>Fort Collins</td>
<td>5</td>
<td>14.41</td>
<td>15.22</td>
</tr>
<tr>
<td>Loveland</td>
<td>129</td>
<td>16.70</td>
<td>15.76</td>
</tr>
<tr>
<td>Longmont</td>
<td>171</td>
<td>15.85</td>
<td>14.86</td>
</tr>
<tr>
<td>Brighton</td>
<td>35</td>
<td>15.07</td>
<td>14.67</td>
</tr>
<tr>
<td>Fort Lupton</td>
<td>48</td>
<td>16.52</td>
<td>14.63</td>
</tr>
<tr>
<td>Ovid</td>
<td>27</td>
<td>14.01</td>
<td>13.08</td>
</tr>
<tr>
<td>Sterling</td>
<td>83</td>
<td>16.80</td>
<td>15.42</td>
</tr>
<tr>
<td>Brush</td>
<td>58</td>
<td>16.35</td>
<td>16.03</td>
</tr>
<tr>
<td>Fort Morgan</td>
<td>44</td>
<td>15.45</td>
<td>14.76</td>
</tr>
</tbody>
</table>

*Decrease

Colorado Dist.... 658 16.20 15.10 1.10
Billings ...... 498 13.58 12.67 .91

Fully 50 per cent of the total harvested acreage in the Loveland and Billings districts was on fall plowed land. Sterling farmers also made a good record with 39 per cent fall plowed; and Longmont and Brush came next with 34 per cent each.

The figures show that in Colorado as a whole the average yield was at least 1.10 tons higher on fall plowed ground, and this must be regarded as conservative because of the statistical method by which the record was made.
JOHN TAKES A BEET FROM THIS FIELD
and this field, as John Maisch will tell you, was in beets last year on his farm between Berthoud and Campion in the Loveland district. He had difficulty getting into this field this spring because of wet weather, but finally got his tractor and plow to work the first week of April. But it was impossible, in such wet soil, to get the kind of seed bed John wanted. The field was planted April 20 and the seed lay in the ground a whole month. On May 20 it was irrigated for germination and thinning started June 12. The stand is not the kind of stand John would like to have.

JOHN TAKES A BEET FROM THIS FIELD
and this field, as he will tell you, has a different history. This field was in wheat last year. It was plowed in September and was all ready for a little surface work and timely planting this spring. This field was planted April 1. In other words, this field was being planted the same week the upper field was being plowed. Moisture that helped this field hindered the other one.

JOHN SHOWS YOU THE TWO BEETS AND THE TWO FIELDS and this was how they looked June 13 when these photographs were taken. You have to look hard to see the little beet in his hand, but you don't have to look very hard to see the difference between the two fields. John Maisch will also tell you that hereafter he intends to plant all his beets on fall plowed land if it is humanly possible to get the job done! And hundreds of farmers in this region are making the same resolution.
Much Depends On When You Do It!

**WHEN** should alfalfa ground be plowed?

Fall plowing is best. Early spring plowing sometimes "gets by," but late spring plowing is generally to be discouraged.

And even if you turn alfalfa under in the fall, there may be a real difference between early and late fall work.

Look at the picture above. It comes from Lovell, Wyoming. Here you see beets planted on alfalfa ground on the farm of H. S. Tippetts.

The left side of the picture shows land plowed in August, before the alfalfa was mature. The alfalfa was killed and decomposed in time for beets.

But on the right side, the plowing was not done until late September. Mature and hardy, the alfalfa was hard to kill, and renewed growth the following year played havoc with the beets.

According to Mr. Tippetts, all farm operations were handled identically on these two pieces of land, except for the difference in the dates of turning under the alfalfa.

It has been a successful practice in the Lovell factory district to plow under a heavy third crop of alfalfa in the fall, to be followed by beets the next year. A coat of manure is spread into the hay before plowing wherever fall manure is available.

The success of this practice depends entirely upon how thoroughly the grower performs the following essential practices:

1. To have the proper soil moisture at the time of plowing.
2. The plowshare must be kept sharp.
3. The plow must not be allowed to take too wide a furrow.

4. The ground must be worked down immediately after plowing.

5. The ground should be fall irrigated if necessary to keep a suitable soil moisture for a maximum decay of the green manure.

—P. B. Smith.

Eliminating Some of the Hard Work from Manure Loading.

New Methods for Handling Manure

NEW knowledge of manure and new ways of handling it are evident in the beet-growing areas. The advantages of fall manuring over spring manuring have been demonstrated. Many farmers, who previously applied manure in the spring, have switched to the fall side.

Various types of manure loaders have been developed in recent years. The above photographs show Fred W. Schmer, prominent beet grower of the Loveland district, talking to Ed Reifschneider, left, about the loader developed by Mr. Reifschneider near Kelm, Colorado. No. 1 shows the machine. No. 2 shows it crowding into the manure. No. 3 shows the loader turning toward the spreader, and No. 4 shows the loader ready to dump.

Carl H. Schmidt, Loveland district, came back strong with 50 acres of beets after being out a few years. Spring plowed land is all irrigated and Carl is getting a fine stand of beets.
DETERMINATION makes crops!
The accompanying picture shows a stand of beets any farmer would be proud of, but if you had seen this same field six years ago you would have shrugged your shoulders and said "just too bad," because the field was so heavily infested with bindweed that no crops could be grown at all.

But Arthur Bein had determination. In the summers of 1934 and 1935 you could have seen him cultivating and cultivating this weed-ridden field in the Sunnyside district west of Johnstown. In 1936 he was able to get a stand of corn and grew peas in 1938. In August, 1938, he was on hand with his plow. He did a good job of fall plowing and worked it down carefully. This fall plowing enabled him to get a fine early start with beets this year, 1939.

Most folks think the first half of April is early planting, but Mr. Bein had his seed in March 25, and all the wet weather that was delaying other farmers was just what he wanted.
An excellent germination stand resulted and thinning was finished May 10, before some fellows had even planted. He started first irrigation June 8 and was winding up the job June 13 when these pictures were taken. That shows what determination will do—getting the best of the bindweed and planning ahead so as to do things at the right time for the right result.

Mr. Bein uses the roller shown in the photograph after ditching out beets and before irrigation in order to smooth out the ditches and do a more efficient job of applying water. This roller is no longer manufactured but any farmer, according to Mr. Bein, can make a similar one by taking a corrugated roller and building up the beveled parts out of wood turned out at a wood-working plant. He says the roller puts the ditches in excellent shape for irrigating.

The Energy Used by Plants

The world's total working capital—the food which we need for carrying on the world's work—depends on a process which, under present-day conditions, is only one-half of one per cent efficient. Such is the verdict of those who have measured the efficiency with which green plants manufacture sugar from carbon dioxide and water in the presence of sunlight, according to Leonard H. Engel in the magazine Science.

That process, photosynthesis, is the primary means by which food which plants and animals require is manufactured. Yet photosynthesis, which is carried on in the green portions of all plants, makes use of only a tiny fraction of the energy from the sun which strikes the plant. This half of one per cent efficiency compares unfavorably indeed with the 33 per cent thermal efficiency of some modern steam engines and the slightly higher efficiency of the turbine. But the plant's sugar factory is shown in a better light when it is realized that the object of photosynthesis is not to do work, but to manufacture food.

Calculations by Professor Edgar N. Transeau, of the Ohio State university, indicate that the energy that will come from the corn crop will represent barely more than half of one per cent of the energy contained in the sunlight which will strike America's cornfields during the hundred days from June to September when the corn is growing. Similar figures have been derived by Professor Walter Noddack, of the University of Freiburg, who made measurements on a large scale with various types of grasses.

More than the half of one per cent is actually used by the plants in photosynthesis, but the excess goes to the manufacture of sugar which is burned immediately by the plant to provide some of the energy for growing and carrying on its life business. Only 33,000,000 of the 2,043,000,000 calories of energy that fall on a single acre of corn between June and September are used in the manufacturing process of the plant. Two hundred pounds of sugar is the daily output of Professor Transeau's acre, but only a fourth of the sugar made is still available by the time the corn plant has become large enough to harvest. By far the larger part of the energy which a plant absorbs from the sun's rays is
used for carrying on other functions of a growing organism.

The water used by the acre of corn during the summer would cover the acre to a depth of 15 inches if it were not absorbed by the soil and if it were not otherwise lost. Actually 910,000,000 calories, a little more than 45 per cent of the energy reaching the plant from the sun, is absorbed in order to evaporate the 408,000 gallons of water. The water is evaporated in the essential process of transpiration by which oxygen formed as a by-product of photosynthesis is eliminated. Fifty-four per cent of the balance of the heat from the sun is of no use to the plants.

Plants operate at a maximum efficiency possible today, according to Dr. Earl S. Johnston, of the Smithsonian Institution. But they could operate more efficiently if they had more carbon dioxide available. At one time, during the Coal Age, when plant growth was luxuriant, the earth's atmosphere may have been richer in carbon dioxide and the plants of that day consequently more efficient. Professor Noddack measured the amount of energy used by a plant by calculating the amount of energy required to manufacture sugar by photosynthesis and then determining the amount of sugar that a group of plants manufactured during a given period of time. A sensitive electrical device was meanwhile registering the amount of light that fell on the plants.

The old Eberhart place south of Berthoud, purchased by Roy V. Welty, is beginning to show the activity of the new owner. The barn has been painted and a new house will be built this summer. Roy intends to make this his future home.

GOOD STAND ON 58 ACRES RIDGE PLANTED

C. P. Fritzler cultivating ridge-planted beets June 3, after successful irrigation for germination.

IRRIGATION for germination presented no extraordinary difficulties to Harvey Duell and his tenant, C. P. Fritzler, of Kuner. Their 58 acres of beets on rather heavy flat land were all ridge planted for easier and more efficient irrigation, and following early application of water, they have an excellent and uniform stand on the entire acreage with good yield prospects. Mr. Duell, who owns and operates three quarter sections of productive land, is a large operator in livestock feeding, and as a side line, raises large numbers of turkeys, this year having 10,000, which, of course, eliminates the grasshopper menace entirely.

It is with sincere regret that we record the passing of Fred H. Moore, pioneer farmer, landowner and beet grower of the Windsor district. Mr. Moore was taking treatments in the hospital for a heart ailment when pneumonia set in and brought the end quickly. His absence is keenly felt by the community.
Several new power cultivator outfits have been purchased by growers on the Huntley project, Montana, this spring. Among those noticed were on the farms of P. O. Walter of Wyne station, G. P. Reiter of Knox station, and August Rieman of Knox station. Old Dobbin is steadily losing popularity for all farm work.

J. A. Hudson, farmer south of Gering, is spending a few weeks in California.

Emmett Dick, Joyce station, completed thinning on his two contracts June 8.

S. P. Rosenbaum recently installed a new pumping plant on one of his farms near Crook. Each of Rosenbaum's Crook farms is now equipped with a pumping plant for supplementary irrigation.

Miss Agnes Mercer, daughter of Mr. and Mrs. Frank Mercer, Big Springs, was valedictorian of the 1939 graduating class at Big Springs. For her high scholastic average she received a scholarship to Nebraska Teacher's college. Miss Mercer was also chosen as one of 250 students in Nebraska to receive a regents' scholarship.

Paul Mathews, a young farmer who has just started operations for himself, is doing a fine job of farming 120 acres northwest of Iliff, Colorado.

A. C. Kluver has built a fine new 3-room house for the labor on one of his farms in the Giddings district, Fort Collins. F. H. Miller is the tenant on this place and August Haas holds the beet contract.

Kopriva's, Powell, Wyoming's largest department store, was practically destroyed by fire June 6. That night after L. E. Crawford had retired, he was awakened by someone violently pounding on the door. He answered the door and there stood one of his beet labor. "No frijoles! No frijoles Kopriva's." Then it occurred to Mr. Crawford that temporarily the worker would have to get beans from some other store.

Jake Vogel, Jr., has beet fields that show the advantage of fall plowing. In spite of the fact that Mr. Vogel's beets were severely hailed on May 31, his field of beets on fall plowed land presents the most promising prospect in the entire DeGraw area of the Bayard territory. Mr. Vogel expresses himself very much in favor of fall plowing and says that in the future he shall plan to spread fertilizer and plow all of his beet land in the fall.

When the recent rainy period hit Montana, Frederick Baumann, Overstreet grower, had just completed cross-blocking his beets. During the two weeks in which thinning was materially delayed on account of the rain, his beet crop made a good growth with the beets not getting over-
Its grasshopper time again and here we have Arthur G. Wykert’s tractor all equipped to catch them. Melvin Wykert is driving the tractor. An oil bath really does the trick to each catch. The tractor is faster than horses and covers more ground with greater effect.

crowded. This also gave his beet laborer, Henry Harmon, plenty of time to thin out the crop. Cross-blocking saved money for both grower and labor.

John Croissant of Kuner recently had the rare experience of having twin colts born to his seven-year-old mare “Dolly.” Unfortunately, one of the colts was lost a few days after birth, although both appeared to be perfectly normal.

C. C. Hendershott, Loveland district, is able to be up and about again after a severe attack of influenza.

Mr. and Mrs. Matheny, near Morrill, are completing a modern 7-room house with a full basement finished and furnished for utility and convenience.

Harry Anderson (one of Powell’s humorists) walked out to his beet field through a fog of webworm millers. After admonishing his beet labor in the best Swedish language he could command for leaving the beets too far apart, “Why,” he said, “you will starve the web worms to death.”

Lee (Buster) Briggs at Twin Bridge has had his annual fishing trip and is now repairing the threshing outfit for a good run.

W. Barkemeyer, Wyne station, Montana, is feeding out a carload of steers this summer. Feeding started the latter part of November and he intends to carry them thru August.

Among the improvements noted in the Everett territory of the Scottsbluff district are the better living quarters provided for beet labor on the farm leased by George Ruppel and owned by Mrs. Fannie Brecht. Improvement of labor houses is a good investment as it will pay ample dividends in better beet work by appreciative labor.

H. R. Lippincott, Charles Bailey, Rhea Heuerman and Paul Blood, Lyman growers, have purchased mechanical grasshopper bait spreaders which are in great demand at present.

Roland W. Stull, of Crook, Colorado, is raising 2,000 turkeys this year. Stull is training the flock so that he
can herd them on fields infested with grasshoppers.

Fall seed bed preparation on farms operated by Sam and Henry Baum, Knox station, Montana, has already paid these growers handsomely. A perfect stand germinated on their 67 acres and only part needed irrigation before thinning. Thinning was completed by June 8. Their crop prospects point to another high yield.

Frank "rolls his own" with his son turning the crank.

Frank Magnuson, Windsor district, mixes his own grasshopper poison. He has mounted a 50-gallon barrel on an iron bar through each end of the barrel at an angle very much off center. A pulley for a tractor or a crank to turn by hand does the mixing very efficiently.

W. G. Forney’s and Pete Martinez’ early beets certainly have withstood the hard winds during the past several weeks in the Ovid district.

Jean A. Berg, son of Mr. and Mrs. E. A. Berg of Pompeys Pillar, Montana, is now taking training in chemical warfare at the U. S. arsenal at Edgewood, Maryland. Jean is a junior at Montana State college and the only boy chosen for this training. He was chosen because of his high scholastic standing in chemistry and his excellent record in the R.O.T.C.

Jacob J. Frank and his wife have made many improvements on the farm they recently purchased from Chris Schott, Jr., four miles north of Powell dump in Logan county. They have set out beautiful trees and shrubs and painted all the buildings.

Weld county is overhauling the highway from Milliken to Greeley. Fills are being built, bridge approaches and railroad crossings graded up, hills cut down, and the whole road vastly improved.

Herzog Brothers, Jake and Henry, again have prospects of a fine crop of beets on 68 acres. They farm in the North Sterling country.

John Crane and Floyd Bird have a splendid crop prospect on fall plowed land in the Boxelder district, Fort Collins. Both are tenants on farms owned by Mrs. Almeda Springer.

Miss Edith Ward, daughter of Roy Ward of Sanders, Montana, was married recently to Mr. Malcolm of Forsyth. The young couple will make their home at Forsyth.

Elmer C. George and his father-in-law, Elmer Henry, land agent at Crook, are doing an excellent job of
modernizing the farmstead on the H. G. Wellensick farm one-half mile north of Crook. Some activities being carried out include new feed yards, construction of an elevator, landscaping the yard, and bind weed control on the farm.

Mr. and Mrs. H. L. Sams and sons, Donald and Harvey, of Scottsbluff have been vacationing at Grand Lake, Colorado.

Joe Long, Stegall station, Lyman, has purchased 500 eight-week-old turkeys to place on his farms to catch the grasshoppers.

Jack Wever, of the Sarben district, is making a test of “timely and frequent” irrigations, having applied a second regular irrigation to one field by June 16th. A remarkable difference was noted after the first irrigation on June 6, in comparison with other fields that had not received water.

Dave Kraus of Sanders, Montana, and Alidor Buyse of Finch each shipped a carload of steers to the St. Paul market the first week in June. These shipments finished up their feeding operations for the season.

Martin Mari, who assists his father, John Mari, Sr., in growing large beet crops at Ford station, was married on May 9.

W. L. Davis, a Black Hollow grower, Fort Collins, is making a satisfactory recovery from an operation recently performed at the Larimer county hospital, Fort Collins.

Patrons of the Fairview (Plummer) school on the “Dutch Flats” northwest of Mitchell, were the first in Scotts Bluff county to receive a “Superior” plaque for their school. Only
16 other rural schools in Nebraska have satisfied all requirements for this award.

The farm barn of Fred Nipple of Howard was recently burned to the ground. The loss included a small quantity of grain, some farm machinery and harness, and a large quantity of grasshopper bait.

E. L. Wrighton, Severance, Colo., grew tired of trying to keep up pressure in a sprayer by the old hand method. He thought it quite unnecessary that hand power be used anyway and he did things about it. First he mounted the old barrel on a frame with pneumatic tires. Next a small gasoline motor with a pump jack was mounted so that the pump on the old sprayer was run by the gas motor and the job was done. The extra power permitted installation of an additional paddle to keep the paris green agitated in the barrel.

Mr. and Mrs. Peter Wagenman and family have just moved into their new home on their 100-acre farm, one mile north of the Newton dump in the Pompeys Pillar district. The Wagenman family moved into this district fifteen years ago from Jamestown, North Dakota. They worked beets the first year and since that time have rented the Minnie Peterson farm. Three years ago they bought the 100 acre farm which joins the Peterson farm. The last three years they have been improving their new farm and have built a very comfortable six-room house.

Mr. and Mrs. Wm. Ledingham of Mitchell left Friday, June 9, for a three-month trip abroad. Among the countries they expect to visit are England, Scotland, France, Germany, Italy, and Switzerland. Naturally, they plan to take in the New York World's Fair enroute.

C. E. Van Meter, new owner of the well-known Jensen place northeast of Berthoud, is building a new feed lot and making other improvements on the house and barn. Leonard An-
derson, present tenant, is aiming to bring this farm back in the high producing class.

Evidence of the interest in improved practices in the beet business is to be had on all sides. Herman Koenig, in the Loveland factory district, has patented the blocking hoe shown here. The advantage it has over the common garden hoe, according to Mr. Koenig, is that the side cutting blade cuts through the undisturbed ground before the main blade strikes the surface. By cutting in this manner, no dirt is moved on to the plants left in the block of beets. The Koenig blocking hoe is double edged, too, either edge being available by simply turning the implement over. It is made of tool steel and can be manufactured for less than the standard hoe.

Herbert Carlson and Miss Florence Draggo were married at Loveland in May. They are living on the Carlson farm southeast of Loveland.

Jacob Alles and Jacob Amend, who farm near Billings, made a business trip to Northern Colorado the first part of June. They were able to take a few days off because of recent rains which made fields too wet for work. They report that this condition did not exist in the parts of Colorado where they visited. On their return both men report that Montana looks awfully good to them.

Norman Davis, son of S. J. Davis, Hartman station, Lyman, and Dwight Pumphrey, son of F. D. Pumphrey, Hartman station, have returned from school at the University of Nebraska, where they are taking an agricultural course. They are working on their fathers' farms this summer.

Mrs. Jacob Ochs was fatally injured in an automobile accident the last of May and died in the Billings hospital a few days later. Mrs. Ochs was the mother of Fred and George Schodt of the Shepherd district.

Among those who irrigated beets up in the Brighton district this year was Gordon Smythe, seen here in his field, May 22.
The Beautiful Home of Mr. and Mrs. G. C. Binder Near Milliken.

The accompanying picture shows the beautiful dwelling on the G. C. Binder farm just west of Milliken. Mr. and Mrs. Binder and their sons are prominent farmers in this community. Mr. Binder came from Chicago in 1893 and worked four years on the old Parish farm at Johnstown. He started farming in 1898 on the Sauter farm which is now the farm owned by the Great Western Sugar Company at Johnstown. In 1902 he purchased the farm where he is now living and has been farming there ever since. He has 500 acres of high class irrigated land in this farm and 220 acres of dry land closely adjoining it. This 720 acres of land is being farmed by Mr. Binder and his sons Floyd and Howard. The other son, Charles, is farming 240 acres of land near Aurora. There are three daughters in the family, all of whom are married. Mr. Binder's place is an example of what can be accomplished by good farming in this area, as the crops he produces are some of the highest yielding crops produced in this community. Mr. Binder is also president of the First National Bank at Johnstown.

Gottlieb Schiel, who bought a farm north of Sterling last year, has built a new one-room house and repainted and remodeled his farm house this spring.

Ben Stewart, who has lived for a number of years west of Billings, recently had an attack of the flu. At the age of 75 this is his first sick spell.

Fred Roberts, of Lemoyne, in the Ogallala district, cross blocked his entire forty acres of beets. Contrary to rumors, the beet workers admit that they can work much faster in blocked fields. Labor did not start thinning until two days after blocking.

John Reitz of Buchanan station in the Sterling district found an extremely useful purpose for some old two-inch well casing which was lying around the farm. Faced with the problem of irrigating his beets for germination on extremely rolling land, John laid 30-inch lengths of this pipe in the banks of his temporary laterals thereby regulating the flow of water into each beet row. The result was a thorough job of irrigation with no washing or flooding of soil.

Byron Ballentine, Brule, loaned his Ford to an Oldsmobile salesman for a week and now he is driving a bright new Oldsmobile sedan. Byron's beet crop is looking better at this time than it did a year ago.
The State of Wyoming has erected a large grasshopper poison mixing plant at Pine Bluffs. The federal government is furnishing the material and W. P. A. labor is used in the mixing. Eight men are given steady employment. The capacity of the plant is from 600 to 1000 sacks per day. However, the demand still exceeds the output of this plant. Farmers from Laramie and Goshen counties, Wyoming, and from Kimball and Banner counties in Nebraska, have been supplied with poison from this plant.

The vines growing from the holes in the upright, painted barrels setting in the yards of Carl Gompert and Jake Gompert, Redus dump growers, Mitchell, are strawberries.

Albert Huddleston, son of F. E. Huddleston, is home from the hospital after a mastoid operation.


Elmer Giesick, son of Mr. and Mrs. John Giesick who live west of Billings, was recently married to Wilma Rae of Billings. Elmer is farming with his father in the Hesper district.

Roy Eisele who farms on the W. J. Smith Estate land, a mile north of Hygiene, in the Longmont factory district, is again lining up for what should be a 20-ton or better yield. In 1937, Roy had an average yield of 20.47 tons to the acre and followed in 1938 with 19.24 tons average. For 1939, he has 25 acres of land heavily manured from his feeding operations and with 150 pounds to the acre of phosphate added. Beets were planted this year early in April, and thinning was started and finished early.

George Frickel of Siding Two station has taken over the O. M. Wold farm west of Billings. The former renter was Fred Brester.
T HE picturesque gun-toting cow­puncher of the old West has gone. But we still have in this country one of the reasons why the "six-gun" was in the past part of the cowboys' equipment. That reason is the cattle rustler. This picture taken on the plateau two miles east of Custer, Montana, is mute evidence that the days of the "Vigilance Committee" are here again and the cattlemen of the Custer, Tullock and Big Horn districts are looking for a cattle rustler to take the place of this "effigy."

Edgar Pursell, Big Springs, is raising his first crop of beets this year and is doing a fine job. He had to irrigate up all of his crop and has had plenty of grasshoppers to fight. However, his efforts speak for themselves and show that a job can be done properly.

Miss Evelyn Loloff, attractive daughter of Association Director G. W. Loloff of Kersey, was graduated from St. Luke's hospital in nursing on May 24.

John H. Bangert, Loveland district, is on a trip to Minnesota to visit his mother who is now 87 years old.

E. H. Sappington has made some of the sand east of Milliken start to produce crops. He has made that section come through for good crops.

Harold Zeiler and Miss Dorothy Carlson were married at Loveland June 4. They will live at Johnstown, where Mr. Zeiler is principal of the high school.

Robert Schott of Beetland had a large gathering of beet workers on his farm who did a very nice job of thinning 40 acres of beets in just a week.

Ruth Keithly, daughter of Mr. and Mrs. L. A. Keithly, who live west of Billings, was married on June 7 to Newton Pierson, who is foreman for the S. A. Harris Farm company. Miss Keithly was prominent in 4-H club work and graduated from Montana State college in 1938.
Introducing The Cioetatas

THIS PICTURE INTRODUCES

Mr. and Mrs. D. Cioeta and their fine family. Folks down in the east end of the North Platte Valley of Nebraska don't need any introduction. Their beautiful 20-acre farm on the south side of the river between Bridgeport and Broadwater is as well known as the Cioetas themselves. It is a well managed farm. Each member of the family takes pride in it. Each takes some responsibility. And as a family they represent what can be accomplished when parents of old-world extraction turn to America and teach their children the opportunities of American life—particularly those opportunities arising from such a crop as the sugar beet, which responds so remarkably to the effort the farmer is willing to put into it. In the photograph Mr. and Mrs. Cioeta are seated and their seven children, left to right, are Marion, Ned, Ellen, Nicky, Joe, Antoinette and Don.

THIS IS THE WAY THE CIOETAS LIKE TO FARM!

Mr. Cioeta has 71.26 acres of beets this year and when this picture was taken in June, he had the finest crop prospect in the entire Bayard-Bridgeport area. Not one of his neighbors was so fortunate in having so much land fall plowed. But the Cioetas had looked ahead. Their land was plowed in the fall. They were ready to start planting early, when there was still plenty of moisture to germinate the seed and strengthen the plants to meet the dry weeks ahead.

THIS IS THE WAY THEY DON'T LIKE TO FARM!

Here's a small field on the Cioeta farm. There was an unavoidable delay in getting an increase in Mr. Cioeta's allotment. This field had to be spring plowed. The pictures of both fields were taken the same day. They tell their own story. But these beets are getting the same careful attention the other beets on the farm are receiving and the Cioetas will do their best to make them show a good yield. Mr. Cioeta will tell you that fall plowing and early planting go a long way toward protecting the farmer against delays, whatever the cause.
Clifford Eckhardt, son of Harry Eckhardt of Peckham, has just graduated with high honors in civil and irrigation engineering from Colorado State College of Agriculture and Mechanic Arts, and already has a responsible position with Phillips Petroleum company at Bartlesville, Okla. Graduation day was indeed a red letter day for Clifford for he was not only presented with a degree by the college but also with a seven-pound son by his wife on that same day.

 Carl Stahla of Kimball was the first one in this territory to purchase a grasshopper wringer. With this machine Mr. Stahla has been able to reduce the grasshopper population on his farm to a noticeable degree. The wringer is attached to the front of a truck and the truck driven over the fields. The grasshoppers hit against the tin plate and fall into a hopper where they are crushed by two rollers running in opposite directions.

John Melchior, formerly of Ovid, recently purchased a farm in the Sterling district and installed a fine well on this property which is capable of pumping 2,000 gallons per minute.

Dewey Brown, of the Ogallala district, cross-blocked his 15-acre con-tract and his own family has completed thinning the field. Dewey says, "Hereafter all my beets will be cross-blocked each year."

A. F. Bein is back in the sugar beet game in the Loveland territory after a vacation of a few years. From the looks of his beets, he still knows how it is done.

Here's How Mr. Bevelheimer Steps on it!

Stacking hay at 30 miles an hour with the family car and the truck, is the method used by A. Bevelheimer on his farm three miles north of Sterling, Colorado. By an ingenious arrangement, he attaches the hay sweep to the frame of the Buick roadster and brings in more hay than two horse-drawn sweeps.

Jacob and Clarence Lebsack farm near Proctor, Colorado, and have fed both cattle and sheep this year. Their 80 acres of beets were irrigated up early. The picture shows Clarence with their 2-year-old Belgian stallion.
Alexander Dreith at Buda Dump on the C. A. Jeffers place has beets that almost cover the ground on June 8. “That fall plowing sure pays.”

The Sinners left a stand of 115 beets per 100 feet this year.

Henry Sinner and his wife have the Con Bauer contract at Iliff again this year. Last year their harvested stand was 102 beets per 100 feet of row and the yield was 20.18 tons per acre. Their thinned stand this year on June 6th was 115 beets when this picture was taken.

Jacob A. Lechman is sporting a fine new barn, all painted red, on his farm at Hall.

Sympathy is extended to the families of John A. Johnson and D. R. Kline of the Gilcrest district, and J. G. Stephens of the Greeley district, in the passing of these esteemed gentlemen. The entire community, as well as intimate friends and neighbors, has sustained a deep loss.

Peter D. Schlagel, Jr., at Johnstown Dump does not wait for rain to bring up his beets. He irrigated 25 acres in May and now has a good stand of beets.

Jake Eisenach of Atwood has a new son, born June 6, 1939.

Martin Springer is building a new home on the Estes Park road just west of Lake Loveland.

John W. Barber has moved from Route 3, Fort Collins, to Route 2, south of Loveland, where he is farming.

CALIFORNIANS USE TUBE

California beet growers are showing great interest in the use of the soil tube as a means of determining how and when to irrigate. The June Sugar Beet Bulletin, published by the Spreckels Sugar Company cites many instances of time, money and water saved by proper moisture determinations before applying water.

GROWER CONVINCED CROSS-BLOCKING PAYS

Jake Korrell of Cowley, Wyoming, is convinced after his experience last year that cross-blocking assists greatly in getting the beets worked on time. His cross-blocked beets last year yielded 14.74 tons per acre and the beets that were hand worked entirely yielded only 9.2 tons per acre. Both fields were treated in the same manner except for the cross-blocking. Mr. Korrell was persuaded to try the cross-blocking last year for the first time and demonstrated its merits on 10 acres which were mechanically blocked with cultivator knives. He has repeated the cross-blocking again this year.
# Table of Contents

<table>
<thead>
<tr>
<th>Resourcefulness to Be Commended</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>It Paid Last Year to Irrigate Often</td>
<td>115</td>
</tr>
<tr>
<td>Putting Sugar Beets on Special Diet</td>
<td>116</td>
</tr>
<tr>
<td>Lath, Shingle Nails—and Controlled Irrigation</td>
<td>119</td>
</tr>
<tr>
<td>Wasting Water Is Wasting Fertility</td>
<td>121</td>
</tr>
<tr>
<td>Test Shows Higher Yield With Less Water When Shorter Runs Are Used</td>
<td>121</td>
</tr>
<tr>
<td>Fall Plowing Paid Last Year</td>
<td>122</td>
</tr>
<tr>
<td>Let John Show You Two Beets</td>
<td>123</td>
</tr>
<tr>
<td>Much Depends On When You Do It!</td>
<td>125</td>
</tr>
<tr>
<td>New Methods for Handling Manure</td>
<td>126</td>
</tr>
<tr>
<td>How Bein Changed Bindweed to Beets</td>
<td>127</td>
</tr>
<tr>
<td>The Energy Used by Plants</td>
<td>128</td>
</tr>
<tr>
<td>Good Stand on 58 Acres Ridge Planted</td>
<td>129</td>
</tr>
<tr>
<td>Around the Territory</td>
<td>130</td>
</tr>
<tr>
<td>Introducing the Ciocetas</td>
<td>131</td>
</tr>
<tr>
<td>Grower Convinced Cross-Blocking Pays</td>
<td>141</td>
</tr>
</tbody>
</table>

The Great Western Sugar Co., Longmont, Colo.
The proof of the plowing is in the weighing! Fred Brunkhardt of Atwood, Sterling District, estimated on July 2 (upper picture) that his beets on fall plowed land would greatly outyield his beets on spring plowed land. The difference was actually 6.91 tons at harvest. The piles shown in the photograph contain by actual weight the tons they represent as average yields.
The chart shown below, reproduced by courtesy of Lamborn & Company, Inc., shows the relatively low level of retail sugar prices prevailing in the United States as compared with other countries. The prices are for May 1, 1938, or the day nearest May 1 for which figures were available. At that time the retail price for refined sugar in the United States was 5.40 cents per pound. The price for the corresponding date in 1939 in the United States had dropped to 5.10 cents per pound.

### LAMBORN'S WORLD RETAIL SUGAR PRICE CHART

**ILLUSTRATING THE LOWNESS OF THE U.S. SUGAR PRICE AS COMPARED WITH PRICES IN OTHER NATIONS**

**RETAIL PRICES—PER CAPITA CONSUMPTION**

*Copyright 1939 - Lamborn & Company, Inc.*

<table>
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<tr>
<th>Country</th>
<th>1938 Retail Price in U. S. Cents per Pound, Refined Sugar</th>
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<td>Italy</td>
<td>14.23</td>
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<tr>
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<tr>
<td>Ecuador</td>
<td>2.54</td>
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* Retail Prices as of nearest day to May 1, 1938, as compiled by U.S. Department of Commerce.

**Consumption Figures compiled by Lamborn's Statistical Dept.**

*The countries included in this chart represent approximately 62 percent of the world’s sugar consumption.*
War in Europe

EUROPEAN war is of grave personal concern to hundreds of farm families in this region. Many older farmers were born in Europe. Many have relations involved in the struggle. Hope for early peace and safety of relations and friends is the common desire of all.

How the conflict will affect America, its people or its industries, no man can say. Historically, the beet sugar industry was cradled in war. It was developed during the Napoleonic upheavals when France, blockaded by her enemies, needed an internal sugar supply. The important role of the sugar beet in the world war is well known. Since the war, virtually all of the great nations have fostered internal sugar production. It is recognized that sugar, the most concentrated energy food known, is indispensable to soldier and civilian alike, and that it is dangerous for any nation to be entirely dependent on remote supplies.

The immediate objectives of our industry must be to do all that can be done to harvest the highest possible yields per acre from the present crop; to handle the harvest in an orderly and efficient manner; and to lose no time in early preparation of the land for 1940.

Fortunately, the land preparation program has been well under way for several weeks. Farmers in all districts have been busy manuring, diskimg and plowing for 1940. Beet tours have been held, showing advantages of timely preparation as against delayed work.

The amount of activity in the fields, prior to outbreak of war, pointed to satisfactory beet acreage in 1940. With actual hostilities under way, maximum 1940 beet acreage may be indicated, if previous war experience may be taken as a guide.

The outbreak of war in 1914 found America entirely dependent on Europe for beet seed. Today the situation is entirely different, thanks to the foresighted policy of the Company in developing a strong domestic seed industry. Farmers served by The Great Western Sugar Company have an assured supply.
Fall Land Preparation for Sugar Beets

By A. C. MAXSON and H. E. BREWBAKER

It is generally conceded that fall preparation of most soil types is more successful than spring preparation. One should recognize the fact, however, that sandy soils are likely to blow if prepared in the fall and spring plowing is preferred by most growers on such soils. It is probable also that ground should not be plowed if it turns up so dry and cloddy as to be impossible to put into a reasonably good condition following the plow.

Under most conditions fall preparation is the correct farm practice. It is the custom with the more successful growers of sugar beets. Even under very dry fall conditions a thorough disk- ing as early as possible after the previous crop is removed is very effective since it:

1. Cleans up growing weeds, thus preventing further loss of water.
2. Mellows the surface 3 to 5 inches.
3. Provides a loose surface which serves to connect the plowed soil to the unplowed subsoil.
4. Materially decreases the thickness and size of clods turned up later by the plow.
5. Decreases the draft on the plow.

Fall preparation insures a good seed bed without which no crop will produce maximum returns and it makes possible timely and seasonal planting, a prerequisite to larger yields of better quality beets.

Fall preparation destroys weeds, thus saving moisture and reducing the cost of growing the following crop. It also destroys certain insect pests by turning them up and exposing them to the weather.

Fall preparation makes possible fall manuring at a time when there is no peak load on labor. The spring work is lessened materially, facilitating early seed bed preparation and planting. Manuring should follow the first disk- ing. In cases where the soil was so hard that the first disking was not as deep as desired, another disk- ing after manuring is recommended to increase the depth of the loosened soil and to incorporate the manure into this surface mulch.

Following the plow the soil should be harrowed, disked or rolled depending upon its condition. When laid by for the winter, the surface should be, if possible, in such a condition that spring work would consist of a minimum of surface work, such as harrowing and leveling.
THE fall preparation will vary somewhat following different crops, for example:

**Small Grain**

If grain is cut with binder the bundles can be either stacked off the field or shocked in straight rows to permit of a complete or nearly complete immediate job of disk ing. Manuring may be started before threshing so that after threshing the job of completing disk ing, spreading manure and plowing may be finished quickly, thereby taking advantage of what soil moisture remains in the surface.

**Alfalfa or Sweet Clover**

Under good conditions, fall plowed first-year or second-year sweet clover or alfalfa can be worked into a satisfactory condition for a successful crop of sugar beets. Late fall plowing or early spring plowing is less desirable, and late spring plowing of such crops is to be discouraged. Crowning previous to plowing is effective in assuring a kill but it means one more rather expensive operation and can hardly be justified if a kill can be assured through a careful job of early plowing. Moisture conditions must be about right, however, to insure a good job, and an irrigation shortly before plowing may be necessary.

It is better agricultural practice to follow alfalfa or sweet clover with corn, beans, or potatoes the first year, with sugar beets the second year. With early fall plowing and a good kill, however, sugar beets may follow immediately with satisfactory results.

**Corn**

Corn cut for silage makes possible fall preparation during September before beet harvest. The corn stumps need to be up-rooted and brought to the surface so that they will be plowed under deeply; otherwise they seriously disturb cultivation. This may be accomplished by disk ing deeply or pulling with a beet puller. After this the preparation is similar to that for other crops.

**Beans, Canning Peas, Etc.**

These row crops make excellent crops to precede beets since the land may usually be manured and plowed early in the fall thus assuring perfect seed bed conditions. Canning peas are out of the way earlier in the season allowing more time for fall preparation. The fall procedure may be disk ing immediately after the crop is removed, manuring and plowing, or some growers prefer to disk the manure into the surface before plowing.

**Potatoes**

If potato land is to be manured previous to plowing it will be handled similarly to bean land. If manure is not available, it is a fairly common and successful practice to disk deeply, or cultivate with a spring tooth or field cultivator ("Swede Harrow") instead of the more costly plowing operation.
Sugar Beets

While good rotation practice and the possible menace of diseases and nematodes demands rotation, a perfect seed bed may be obtained with less effort following sugar beets than after most other crops. Part of this ease of preparation is due to the usual presence of sufficient moisture, and the absence of weeds in the previous crop. Disking, manuring, and plowing should follow as early as possible after the beets are harvested and the tops removed. This is facilitated by siloing or stacking the tops.

Fall preparation means good seed beds, early planting, high yields and the above-average income obtained by the most successful growers of sugar beets.

Smothers Bindweed With Manure

A N INTERESTING bindweed extermination has been conducted by Louis D. Abrams, south of Loveland. The infested area was given a covering of manure 2½ feet deep early in the spring of 1939. This was left for 5 months and when it was removed this past week it was found that a nearly 100% kill of bindweed was obtained. Although bindweed is one of the most persistent of all noxious weeds it has been effectively smothered out by this method. The great advantage of this kind of treatment is that the land is left in good condition to future crops.

Delmar Mathias, son of Harvey D. Mathias, who delivers beets to the Greeley factory, exhibited pigs which won the grand championship at the Weld County Junior Fair. Delmar also won the pig showmanship honors. He is shown in the picture with two of his litter of pigs at the Fair.
For close to ten years now the Lackman Brothers have been averaging yields like this:

Henry, 19 Tons  Jacob, 17.7 Tons  Dave, 16 Tons

And here's one reason: Manure on the stubble every autumn of every year, with fall preparation and every other operation done right, at the right time.

Shake Hands With the Lackman Boys!

DAVE, Henry and Jacob Lackman, brothers who live seven miles west of Billings, moved into this neighborhood with their parents 26 years ago. Each of the brothers eventually acquired an 80-acre farm and just recently Jacob and Henry each bought another 80 acres across the road from their respective farms.

Since 1930 Jacob has averaged 17.7 tons per acre on an average of 22 acres. Dave has averaged 16.0 tons on 21 acres. Henry has averaged 19.0 tons per acre on 23 acres.

The Lackman brothers are firm believers in fall preparation for beets and late summer and early fall finds them busy trucking manure from the Billings stockyards, 8 miles from their farm. A well fertilized soil, a good seed bed, a good stand of beets, and early thinning is the general rule for these farmers and each spring finds them well on the way to another good beet crop.

Farm records over the past decade show that Henry has manured 75 per cent of his beet land and phosphated 69 per cent. Jacob has manured 91 per cent and phosphated 82 per cent. Dave has manured 88 per cent and phosphated 63 per cent.

The records of the Lackman Brothers over many years prove again that a normal expectation of 16 to 20 tons can be realized by the farmer who, putting his mind and effort to the job, doesn't intend to be satisfied with yields of 12 to 14 tons per acre. Why be "average" when you can set your own sights higher?
"PLOW NOW FOR 1940" IS SLOGAN OF GROWERS PLANNING HIGHEST TONNAGE!
IT'S possible to break clods with an axe or a sledge-hammer or a maul, but other tools will do the job better—disks, rollers, harrows, etc.—if you use them at the right time.

We snapped this picture of John Stahlecker of Berthoud on March 25, 1938. John was disking plowed land on the farm of Charles Glass. Now and then John would get down off the seat and whack the big clods—almost as hard as concrete—with his axe. This particular picture was taken where a straw stack had stood, but other parts of the field were nearly as hard to handle.

The problem of hard clods must be kept in mind by every man who does fall plowing. Fall plowing is a fine practice. It is universally recommended for the right kind of soils under the right conditions. But the job should not end with plowing alone. It is not safe, in this region, to count on enough winter moisture to disintegrate the clods. This should be done with the proper tool immediately following plowing. Enough work should be done so that only surface work is necessary in the spring.

Higher yields normally follow fall plowing. Where farmers sometimes get bad results from fall plowing the first question to ask is this:

"Was your soil left in a rough cloddy condition over the winter?"

Edward and Henry Senn, who farm east of Loveland on the Greeley-Loveland road, threshed 70 bushels of wheat per acre on their place. This is an excellent yield particularly in a dry year like this year.

Mr. and Mrs. Henry Buxman spent about a week visiting his father and other old Fort Morgan friends in Fresno, California. They returned by way of the San Francisco fair and Salt Lake City.
Stimulating interest in what other folks are doing is inauguration of feeder’s tour. Here’s a group of Yellowstone Valley feeders led by County Agent Keith Sime, looking over some 2,000 lambs in the feed lot of W. A. Allison. These lambs were self-fed on cut corn fodder, grain, dried pulp and alfalfa.

Montana Develops Decentralized Feeding

By E. J. Maynard

In contrast to Montana’s large central feeding operations of former days, cattle and lambs nowadays are being fattened on hundreds of beet farms, providing a market for home grown grain and roughage and making a valuable supply of manure for increased crop yields. Sugar beet by-products, and especially beet tops are contributing much to the heavy and efficient gains secured in these many feeding operations.

Cheap and efficient combinations of stacked beet tops, wet beet pulp, grain and alfalfa, coupled with “banana belt” weather were reflected in heavy gains evident on the cattle and sheep as we review the past feeding season. The uniformity of rations fed emphasized the high feeding value of the sugar beet by-products when fed in proper combination with farm grown feeds and a phosphorous supplement. On many farms, large stacks of well cured beet tops provided a windbreak around the feed lot as well as one of the principal ingredients of the fattening ration.

The standard ration for cattle could be summarized about as follows:

- Dried Beet Tops: 14-16 lbs.
- Wet Beet Pulp: 50-70 lbs.
- Grain: 2-4 lbs.
- Dried Pulp: 2-4 lbs.
- Bone Meal: 1/10 lb.

Variations in the above ration included “C” molasses, mill feed, cut corn fodder and in a few instances, tankage. Indicated daily gains on cattle being fattened on the above rations ranged from 2 to 2 3/4 lbs.

An analysis of the rations fed seemed to indicate that beet tops were providing the cheapest and most ef-
icient fattening feed in the ration. One pen of 125 cattle, pastured on beet tops alone, with alfalfa stubble, for a 6-weeks feeding period before being put in the fattening pen had produced an average daily gain of 1.7 lbs. per head. Fed in the drylot rations, beet tops were apparently replacing grain at the rate of 2 1/2 lbs. of well-cured, dried tops to 1 lb. of grain.

Based on relative feed values and costs, each ton of dried cured tops (from 5 tons of beets, and valued at 35c per ton of beets) costing $1.75 per ton, was replacing about 800 lbs. of grain at a grain equivalent cost of only 22c per cwt. This low cost for grain equivalent value in tops, compared to the 75c per cwt. cost of most grain, indicates the saving possible by the use of tops, and also emphasizes the importance in proper conservation and feeding of tops in fattening rations.

Each ton of wet beet pulp fed, costing about $1.10 laid in the feed lot, showed a grain equivalent value of about 55c per cwt. Other feeds used and prices were alfalfa hay $6 per ton, mill feed $14 per ton, bonemeal $2.40 per cwt.

The universal success secured by providing beet by-product rations for cattle with necessary phosphorous thru the addition of a small amount of bonemeal has practically eliminated the use of expensive protein concentrates in fattening rations used in the Big Horn Basin and Yellowstone Valley feeding districts. Results secured by feeders indicate that 1/10 lb. bonemeal fed per head daily to cattle will produce as good results with beet by-products as 2 lbs. of protein concentrate.

Lambs were being handled in the efficient manner now generally adopted by most Montana feeders, and which has developed a strong demand and top prices for Montana fed lambs on the central markets of the country.

The heavy, fleshy end of the lambs are self-fed a mixture of equal parts by weight of dried molasses, beet pulp and grain (generally oats) with a limited feed of hay. The balance of the lighter lambs are fattened on a combination of beet tops, wet pulp, alfalfa hay and a limited feed of grain and dried pulp. Following the findings of the Montana State experiment station, feeders have found that they can put the heavy end of their lambs on a full feed of this concentrate mixture in a few days with little or no death loss and can produce a quick, firm finish at the rate of from .4 to .45 lbs. per head daily. This procedure insures top market lambs in from 40 to 60 days and allows them to be marketed weighing 95 to 97 lbs., before the holidays. It also makes it possible to even up the balance of the lambs to be fattened for a later market with a maximum use of beet tops, wet pulp and alfalfa.

J. H. Schmidt, who farms the George Lee place south of Buda dump on the North Washington Street road, has entered the landowner class. He recently purchased the August Johnson farm which is farmed this year by Harvey O. Lee. We will all watch with interest Jake's new development on this place as he is an excellent farmer of proven ability.

One of the first fields of early potatoes to be dug near Mitchell was one belonging to Riley Brothers. Digging started August 17. A good quality and yield were reported.
The Same Rotation but what a difference in yield with and without manure! These pictures, taken on the U. S. Huntley Field Station farm, show that rotation alone will NOT maintain yields unless necessary organic material is also restored to the soil. The difference here is nearly 7 tons of beets in favor of manured rotation!

Sugar beets in a six-year rotation including three years of alfalfa, potatoes, oats and beets (manured) yielded at the rate of 16.7 tons average over a six-year period.

Sugar Beets in a six-year rotation containing the same crops as above, but beets not manured. These beets returned an average yield of 9.8 tons per acre over a six-year period—a difference in favor of the manured rotation of 6.9 tons.
U. S. Tests Show Highest Yields from Manured Rotations

By DAN HANSEN
Superintendent, U. S. Huntley Field Station, Huntley, Montana

WORK with crops at the Huntley station deals with such subjects as crop rotation, cultural methods and soil fertility investigations, testing and developing new crop varieties and the utilization of crops through the use of live stock.

The main experimental work with irrigated crops includes an extensive series of crop rotation experiments that have been under way since 1912. The purpose of this experiment is to determine the crops, cultural methods and sequences that are most likely to maintain or improve the soil productivity, and to develop a cropping program that will yield satisfactory returns. Included in the experiment is a total of 45 rotations and continuous cropings. Crops involved are those of principal local importance and include alfalfa, sugar beets, potatoes, oats, wheat, barley, beans and corn. The rotations are of various lengths of from one to six years and the crops are grown in various sequences and with various treatments.

Results in this experiment over the 27-year period have yielded information of much value as to crop returns under certain treatments and sequences and will become increasingly important as the experiment is continued.

IT HAS been found that original high yields have been maintained or improved in the better rotations that include legumes such as alfalfa and the use of manure and the proper crop sequence. As an example of this, in a six-year rotation containing three years alfalfa followed by oats, potatoes and sugar beets with manure applied to the beet crop, the beets returned an average yield of 16.7

(Continued on Page 162)

Sugar Beets in "maximum" cropping experiment returned an average yield of 20.7 tons per acre over a thirteen-year period. The highest yield during this period was 26.9 tons. Oats in this rotation yielded at the rate of 100.5 bushels per acre average over the thirteen-year period with a maximum of 136.3 bushels.
FALL PREPARATION MEANS BETTER SEEDBEDS, TIMELY PLANTING, HIGHER YIELDS!

1. What a difference? CARL E. BAY farm, Pierce.
2. HENRY SCHULZ hauling for HENRY WEBER, Fort Morgan.
3. VIC ASMUS, Fort Morgan — "The right job at the right time."
4. J. A. SCHILBEFF, Fort Morgan, and his son, HERMAN, know when to do it.
5. G. D. WEIMER, Morgan County, looks ahead.
6. ADAM STIEB, I'llff, had a sharp contrast between fall and spring plowed land.
7. Fall manure is best, says HENRY RUTZ, Windsor.
8. A good start for RALPH GRAHAM, Jr., Fort Morgan.
9. JOHN SITTNER, Ovid, on the job.
11. R. N. CARVIN, I'llff, has already plowed 65 acres.
12. JOHN MURCHY on the job, Fort Morgan.
13. MIKE NOWAKI, loading fall manure, East Lake.
14. RAY J. WINGER, Brush.
15. DAVE HERTZ's field shows the difference, Windsor.
16. ART KAUP of I'llff gauges the furrow depth.
17. CHRIST WALTER, Brush.
18. JACK PENNOCK disking pea ground, Longmont.
20. SAM LAUCK rides the disk with a smile at Fort Morgan.
21. Fine stand, fall plowed, CHARLES HINMAN farm, Minotare.
22. Turkeys kill hoppers, says H. JOHNSON to DUKE WILLIAMS, Fort Collins.
23. Always an early starter, DICK SAULCY, top grower at Loveland, 1938.
24. NICK SCHAFFNER plowing baled grass at Creek.
tons per acre over the last six-year period as compared to 13.13 tons during the first six-year period of the experiment.

In a similar rotation without manure or other fertilizer, sugar beets yielded at the average rate of 12.95 tons per acre during the first 18 years of the experiment but the yield in recent years dropped to less than six tons per acre, indicating that rotation alone, even where leguminous crops are included, is not sufficient to sustain yields over an extended period.

In the simple two and three-year rotations without legumes or fertilizer treatment, yields were maintained fairly well during the first six years of the experiment but have declined steadily since that time, and have for years been so low as to be unprofitable.

As an illustration of this, sugar beets in a three-year rotation, of potatoes, oats and beets yielded at the average rate of 7.49 tons per acre over the last six-year period as compared to a yield of 17.26 tons in a rotation containing the same crops and sequences but in which manure was applied to the sugar beet crop. Other crops in these rotations have responded to treatment in a similar manner to beets, although to a lesser extent.

A N EXPERIMENT to obtain information as to the maximum yielding capacity of soils on the Huntley station has been under way during the last 13 years. In planning this experiment the results from earlier cropping work were considered and use was made of information as to the value of legumes, crop sequence and fertilizer, including barnyard manure as well as commercial fertilizers.

Average yields per acre in this experiment over the 13-year period were as follows: Alfalfa, 6.64 tons; sugar beets, 20.7 tons; oats, 100.5 bushels; beans, 50 bushels; corn, 73.5 bushels, and wheat, 54.1 bushels.

Changes in Factory Management

SEVEN PROMOTIONAL transfers in the supervisory personnel of The Great Western Sugar Company were announced August 2 by Frank A. Kemp, president and general manager.

D. J. Roach of Scottsbluff, Nebraska district manager, was appointed assistant general manager, Denver. James R. Mason, manager, Billings, Mont., was appointed Nebraska district manager. P. H. McMaster, manager, Fort Collins, was appointed manager at Billings. H. S. Loper, manager of the Greeley and Eaton factories, was appointed manager at Fort Collins. Lyman H. Andrews, manager, Sterling, was appointed.
NEW faces at New Posts: Upper row, James R. Mason, Nebraska District Manager; D. J. Roach, Assistant General Manager; P. H. McMaster, Manager at Billings.

Center row: H. S. Looper, Manager at Fort Collins; Lyman H. Andrews, Manager at Greeley and Eaton; and J. Gordon English, Manager at Sterling. Lower left is Robert L. Kimmons, Assistant to the Manager at Brush.
manager of the Greeley and Eaton factories. J. Gordon English, assistant to the manager at Brush, was appointed manager at Sterling. Robert L. Kimmons, fieldman, Longmont, was appointed assistant to the manager at Brush.

Mr. Roach, new assistant general manager, was born near Sedalia, Colorado. He is a graduate of Colorado Agricultural college, and entered company service in 1908. He has served as chemist, traveling chemist, special technologist, manager at Fort Collins, 1920-1929, also manager at Windsor 1922-29; manager at Scottsbluff and Gering, Nebr., 1929-35; and Nebraska district manager, 1935 to date. He was one of the principal compilers of "Technology of Beet Sugar Manufacture," published 1920, was active in inauguration of technical schools, and is an authority on agricultural and technological research.

Mr. Mason, new Nebraska district manager, was born at Frankfort, Kansas, and entered company service as a fieldman at Sterling, 1916, the year of his graduation from Kansas State Agricultural college. He served 1916-17 at Sterling, Missoula and Billings and was in the Marine Corps 1917-19. He re-entered the company service as a fieldman at Sterling, 1919; was manager, Sterling, 1922-31; manager at Fort Collins, 1929-35, also in charge of the Windsor factory, 1935; and was manager at Billings from 1935 until his current appointment as Nebraska district manager.

Mr. McMaster, new manager at Billings, was born at Frankfort, Indiana; graduated 1916 from the University of Wisconsin; was Great Western farm foreman, Sterling, 1916-18; overseas with Fourth Division infantry 1918; fieldman, Longmont, 1919; in charge of company farms, Littleton, 1921-23; agricultural department, Denver, 1923-25; manager, Ovid, 1925-35; and manager at Fort Collins, 1935 to date.

Mr. Looper, new manager at Fort Collins, was born at Livingston, Tenn.; attended the University of Tennessee; was graduated from Colorado Agricultural college 1915; irrigation engineer with U. S. Reclamation Service 1915-16; entered company service as fieldman, Missoula, 1916; assistant to manager at Lovell, 1919-25; manager at Lovell, 1925-38; and manager at Greeley and Eaton, 1938 to date.

Mr. Andrews, new manager at Greeley and Eaton, was born at Mount Pleasant, Ia.; aided his parents in farming in the Windsor-Greeley area, 1907-08; attended the University of Nebraska; in the navy 1918-19 and commissioned ensign; fieldman at Scottsbluff, 1919, followed by general work as assistant to Nebraska district manager; manager at Lyman, Nebr., 1929-36; and manager at Sterling, 1936 to date.

Mr. English, new manager at Sterling, was born at Greeley; graduated from Colorado Agricultural college, 1916; fieldman at Lovell, Wyo., 1916-18; in the navy, 1918; fieldman at Longmont, 1919-35; and was assistant to the manager at Brush, 1936 to date.

Robert L. Kimmons, new assistant to the manager at Brush, was born at Fort Collins; graduated from Colorado Agricultural college, 1922; entered company service in the agricultural department at Longmont, 1926; agricultural clerk, Scottsbluff, 1928; fieldman, Gering, 1928-38; and fieldman at Longmont, 1938 to date.
Jak e Walter, Jr., who farms just adjoining the City of Loveland on the east, harvested 24.78 acres of barley with an average yield of 92.32 bushels per acre. Eight acres out of this acreage yielded 101.66 bushels per acre.

The Future Farmers of America, of the Roosevelt School near the Messex station of the Brush factory, took first place on their display at the Akron fair. Crops included in this display were corn, beets, beans, grain, tomatoes, cucumbers, cantaloupes and a display of weeds. The following boys are members of this unit: Richard Mengel, Merton Jefferies, Tashio Gato, Tapio Cato, Enriea Mishiio, Billie Gill, Edward DeHaan, Connie Helmut, Jack Sparling, Camillio Diaz, John Howe and Averill Fredricks.

J. E. Wever, of the East Sarben district, is putting down test wells in preparation of having pump irrigation on his farm next year. “Jack” feels that the well will insure him against water shortage in the future, when the K. & L. Ditch is shut off.

A number of farmers in the Mitchell territory have recently installed new pump irrigation systems. Among these men are Hugh and A. E. McElroy, Alex Robertus, Alex Sterkel, Peter Vogel, N. V. Labertew, O. L. Jones, Adolph Swanson and John Springer.

Henry J. Bauer is recovering nicely from the effects of a bolt of lightning that struck a combine he was riding north of Fort Morgan.

H. R. Lutener, who farms just west of Berthoud, has finished stacking 19 acres of red clover for seed. Herb figures that he got about 40 tons of hay. Besides this, he will have his seed and one more good cutting of hay.

The Union Pacific has completed a new stockyard at Greeley Junction, one mile south of Lucerne.

Leon Glenn and Clarence Rincker, 4-H club members of the Lakeview club, presented a very interesting safety bull-pen demonstration before the Lymans Lions club. They will present the demonstration later at the State Fair in Lincoln.

Margaret Cuykendall, daughter of John Cuykendall, of Roggen, Colorado, won first prize on her Hereford steer at the 4-H fair at Greeley.

James A. Stockwell, cashier of the First National Bank, Bayard, recently acquired a farm near Craft dump, known as the Hauck place. Mr. Stockwell is planning considerable work designed to improve the fertility and appearance of his newly-acquired place.

Peter D. Schlage, Jr., who farms west of Johnstown on the Bunyan farm, did not wait for a rain this spring but irrigated up a 25-acre field of beets early in the season. His prospects at this time are very favorable for a good yield.

Willard Kern, son of Mrs. Verna Kern of Prospect, Colorado, won first prize on cabbage and beans at the 4-H fair at Greeley.
A fine showing was made in the Weld County Junior Fair by these young competitors from the Ashton community southwest of Greeley: (1) Lorene Prunty, (2) Kenneth Homyak, (3) Harold Fahrenbruch, (4) Mary Glendenning, (5) John Prunty, Jr.

The Ashton community southwest of Greeley is congratulating its 4-H clubs and their inspiring leaders, Mr. and Mrs. J. Leuty Prunty, for the showing the clubs made at the Weld County Junior fair. The boys won thirteen ribbons. John Prunty, Jr., took three ribbons in the live stock division; Kenneth Homyak, two ribbons in crops and one in live stock; Harold Fahrenbruch, three in crops; Elmer Fahrenbruch and Harold Kindsfather, one each in crops, and Clarence Randall and Melvin Randall, one ribbon each in live stock. The girls took nine ribbons, all in the clothing division. Mary Glendenning led the club with four in second-year work; Lorene Prunty took two and Elmira Fahrenbruch one in second year; while Mary Ann Homyak and Evelyn Heimbichner received one each in the first year class. Outstanding in the record of these two clubs is the fact that every boy and every girl in the two groups completed all requirements for the year’s work.

Henry Erbes, Jr., of Severance and Elsie Fabrizius, daughter of Mr. and Mrs. Henry Fabrizius, of Severance, were married in early summer. After the rush of the spring work was over Elsie and Henry left for Milwaukee for a short honeymoon.

Already nearly one-half of the Powell, Wyo., farmer-feeders of sheep and cattle have contracted with stockmen of the upper country for lambs and feeder cattle. Edgar Swallow, a prominent farmer, feeder and banker of Powell has greatly assisted in bringing cattlemen and farmers together.
and in promoting feeding of project crops in farm feed lots.

John Reitz, Jake Dick, Albert Dick, Albert Reitz, and Herzog Brothers, were among those who exhibited sugar beets at the recent Logan County fair at Sterling.

R. S. Mayberry, whose farm is under the Antero High Line Canal and which has been dry for some time, is selling water from his well to neighbors so they may save their beets.

James Green, son of K. B. Green, Brighton district, won county champion in the beef cattle class.

C. O. Stout, Knox station, Montana, with his family, together with the Gotfred Oblander family, is spending some time on the Boulder river.

Mr. and Mrs. Fred Schmidt, Gering district, have gone on a trip to Oregon where Mrs. Schmidt will visit a brother whom she hasn't seen for 37 years. They expect to visit the World's fair before returning home.

The Otto A. Kolb family of Hysham, Montana, were visited by two sisters of Mrs. Kolb from Missouri. The party motored through the Yellowstone Park.

Oscar Swanson, who farms the Bунyan farm east of Berthoud, has disked 35 acres of stubble ground and was manuring preparatory to fall plowing. This should give Oscar a good start on his 1940 beet crop.

Mr. and Mrs. Earl Carson of the Janice district, Lyman, Nebraska, are visiting Mr. Carson's relatives in Iowa.

Torance Craft, who was for about twenty years an employe on one of Congressman Cummings' farms, has started farming for himself. Mr. Craft will deliver his beet crop to the Kluver dump, Fort Collins district.

Max Emeson and A. N. Dinner have just completed a new house on their farm south of Kersey for Chris Webbe, Jr., tenant.

Gerald Turner, Loveland, is following a good farming practice by plowing under his third cutting of alfalfa, thus not taking any chances on having trouble with a foul growth in his crop next spring.

D. H. Ruhl started hauling manure the last week of August from Miller and Rediess feed yards at Brush.

Rene J. Martin and Clark Hollingsworth, of the Ogallala district, are contracting feeder lambs in Wyoming for their farms.

George B. Lapp and Chace Brothers have placed in operation a new irrigation well with a capacity of 1,600 gallons per minute. This new well will supplement their ditch water on 320 acres of land in the Fort Morgan district.

Harley Grove and W. D. Kay, Eaton growers, have both dug pit silos.

Leon Schroetlin, who farms the Alford Estate west of Loveland, which is managed by Mrs. Charles Vottier,
had an excellent yield of 85 bushels of barley per acre this year.

Ed Hoier, Padroni grower, is making some fine improvements on his home and other farm buildings.

Paul Grammens and his steer.

Paul Grammens, son of Rene Grammens of Fee station in the Billings district, is shown with his fat steer which he fattened as a 4-H Club project. Paul's steer won second in the 4-H Club Division and fifth in fat stock class at the Montana State Fair, Great Falls, Montana. The steer sold for 15½c per pound.

Harry and Harold Anderson of the Lyman, Nebraska, district have just returned from a trip back east where they visited relatives and friends, and took in the World's Fair in New York.

Walter Johnson and Charles Urano, Platteville, took first on Spotted Poland China sow at Weld County Junior Fair at Greeley.

Haig Hagihara, son of Mr. and Mrs. Tom Hagihara of Bridgeport, left June 24 on a trip to Tokio, Japan, to be gone approximately one and one-half years. While in his father's native country Haig will attend Japanese schools.

Fred Brunner of Severance has purchased the Cecil Hickman house in Windsor and will retire from the farm this fall. Mr. Brunner has purchased one of the attractive homes in Windsor and he and Mrs. Brunner will have a most comfortable home. However, this kind of comfort will not be new to the Brunners for they are leaving one of the best improved farms in the Severance district.

John Erickson, who farms the Hamilton place north of Buda Dump, Loveland, already disced 20 acres of grain ground so as to get it in better shape for conserving fall rains and also it will be in better shape for him to plow when conditions are right.

Dick Godfrey of Cowley, Wyoming, has combined dairying with his beet raising, and finds that increased manure gives increased tonnage.

David Milhein, son of J. O. Milhein, Brighton district, won County champion for Belgian stallion colt.

Mr. and Mrs. Frank Sindelar, Ballantine, Montana, are receiving congratulations on the arrival of a baby daughter, August 22.

Mr. and Mrs. Robert Colson and family and Mr. and Mrs. Frank Schenbeck of Gering recently returned from a trip through the Northwest where they visited in Washington.

Roy Peterson has disced, manured and fall plowed the most of the land he plans on planting to beets next year. The ground has been worked down after plowing and should be in excellent shape for his 1940 crop in the Loveland district.

Alex Witman, Sinnard station, Fort Collins, believes that a well-chosen herd of milk cows works in well with the growing of beets. Alex and his
family do all the work necessary to care for both the cows and beets.

L. D. Gibson and family of Neiler, Montana, just returned from a trip through Yellowstone Park.

John Rienks has installed a new well on his place in the Hambert district. The Rienks' farm is tenanted by Jake Steving.

Carl W. Warberg finished combining approximately 750 acres of grain on his several farms in the Loveland district. He reports not a single delay in his harvesting operations for the season which is a remarkable record.

Carl Brethauer rented the M. M. Mitchell farm south of Brush. He is plowing with two tractors.

John W. Cox, of Sutherland, Nebraska, a new prospective beet grower for 1940, has just completed a 1,600-gallon well on his farm. All his proposed beet acreage has been fall plowed.

J. Don Crouch, Clem Solt, Ralph Solt and Leonard Keagy have just returned from a trip to Texas, where they bought cattle that they are now placing on feed in their respective lots in the Fort Morgan district.

Louis Dinner, beet grower and large livestock feeder, has just completed a cattle feeding pen, 800x600 feet, on one of his farms north of Cloverly, Eaton district.

The F. D. Pumphrey family, Hartman station, Lyman, have been vacationing in the Colorado mountains.

D. R. Pulliam on his place north of Great Western Sugar Company factory, Loveland, has manured and plowed about 15 acres of his pea land.

Albert Watada, Platteville, took first on Duroc gilts at Weld County Junior fair at Greeley.

Mr. and Mrs. Henry Seng of Towner district, Bayard, are the proud parents of twin daughters born August 1. The children have been named Carol and Caroline.

Jacob Stromberger, who has been on one of Carl and Mae Barry's farms for a number of years, will retire and move into Windsor this fall. His youngest son, Carl, will take over the pilot's job for next year.

A modernization job has just been finished by G. Chennoweth, northwest of Loveland. A Deleo plant and water system has been added to his home. His work was done all by himself.

Friends and neighbors of Joe Maier, Sr., are hoping for a quick and complete recovery from his recent illness. Joe has long been a grower in the Padroni section as well as his sons, Joe P. and George.

G. W. Gillham of the Gallup district, Brighton, is plowing under the remains of his bean crop and preparing the land for beets in 1940.

With the continued dry weather and shortage of water under some ditches, irrigation wells are demonstrating their value. Henry Pfeif and George Peak on the Loveland-Greeley road have been pumping water on beets, cabbage and alfalfa.

Carbon county captured the last four out of five sugar beet prizes at the Midland Empire fair in Billings. E. B. Nelson took second place; John Horst, third; Laurence Bauwens, fourth; and Chas. S. Nelson, fifth. The selections were made with the assistance of Walter Nelson, who has completed his first year in agriculture at the Agricultural college in Bozeman, Montana.

Mr. and Mrs. Glen Clifton of Gering recently returned from a vacation trip which took them to many scenic
spots around Denver and Colorado Springs.

The contractors are putting the finishing touches on the overpass two miles west of Pompeys Pillar, Montana. The overpass will be opened for use September 1. This overpass eliminates a very dangerous crossing.

Joseph A. Johnson of Gilcrest recently completed a new irrigation well on his place. The well is producing 800 gallons per minute.

The baby beef steer owned by Charles Toyne was judged first place in Shorthorn division and grand champion of the show at the Sedgwick County fair.

Arnold King, son of W. F. King, is spending the summer with his parents east of Lyman. Arnold is a professor in the history department at North Carolina university. Palmer, another son of Mr. King, has been transferred from Washington, D. C., to Billings, Montana, where he will be employed by the U. S. Reclamation Service.

John Brunner, who has business interests in Windsor as well as operating a farm in the Black Hollow district, has bought the farm owned by Florence Law, and farmed by Gerhart Brunner.

Albert W. Avery recently installed a new well on his place which is farmed by Edward Hemple of the Hambert station.

Fred Schmer recently cleaned his large feeding corrals, using a Reif-schneider power manure loader for the job. Many Loveland district neighbors who saw the machine working were enthusiastic about its performance.

Gary growers in the Brush district were pleased to see the piler on the ground August 23.

Dave and Henry Weber of the Fort Morgan district found time to take their wives and spend two weeks in California. The San Francisco fair was one of the high lights of their trip.

Kleber Brothers, beet growers and dairymen east of Ault, have recently finished building a 60x22 concrete block machine shed.

Oscar E. Hanson purchased the Hugh Clark farm, Loveland district, last spring and there was a field of bindweed on the place which Mr. Hanson is taking care of in good shape by clean cultivation every week. Everyone should control bindweed or it will

Donald Dreyer, Sugar Beet Champion.

Donald Dreyer, of Brighton, son of Frank Dreyer, won a trip to the State Fair at Pueblo, being crop champion with his 4-H sugar beet project.
soon cause a lot of damage to crops.

Jacob Weinmeister, Stegall station, Lyman, is pasturing 1,900 turkeys to rid his place of grasshoppers. The turkeys are owned by Frank Warner, farmer living east of Morrill.

Harry and Ben Konishi, Platteville, took firsts on Guernsey heifer calved before July 1, 1938, and heifer calved after January 1, 1939, at the Weld County Junior fair at Greeley.

John J. Jimerson of Towers station has purchased a 160-acre farm north of Bayard. The Jimerson family will move to their new location in the spring.

Philipp J. Lind will make his home in Windsor after the crop is out this fall. Mr. Lind has been operating the lower Barry farms. Alex Stromberger, who has been farming the Tingley Place will replace Mr. Lind.

Edward Doerr of Lovell, Wyoming, recently purchased a fine lot of Hereford steers which he intends to feed out this fall.

Kent Lane, Sears station, Lyman, has returned from a trip to the New York World’s Fair and Canada.

Wayne Deimer, Hartman station, Lyman, has just returned from Bryan’s Memorial hospital at Lincoln, where he has been receiving medical treatment. Wayne has been ailing for the past year, but is now showing improvement.

Zeller Brothers at Kelim, Loveland district, are using a grasshopper killer that electrocutes the insects on contact with the charged grid that covers the device. It is a very effective and novel device.

Growers at Ford station in the Sterling district are already expressing their satisfaction with the erection of a mechanical dump, replacing the old highline.

Shirley Jane Uhrich, 10 years old, of Koenig, east of Loveland, took her Aberdeen Angus calf, Prince Charming, to the Weld County fair and won first place against a field of thirty-eight of the best in Weld county. The class was “Best calf weighing under 700 pounds.” Against 160 competitors for Grand Champion he placed 5th. Shirley is the daughter of Mr. and Mrs. John Uhrich. Mrs. Uhrich did some winning, too. In the Home Economics division she won: first, canned berries; second, canned apricots; third, canned pork, canned chicken, canned carrots; and sixth, group of canned products. Mr. Uhrich, who has farmed practically all his life in the Windsor and Loveland districts, is an earnest proponent of rotation farming, using an eight-year rotation including beets, grain, sweet clover, potatoes and alfalfa.

Oscar Sanstad, Brighton district, has just completed a new well which will handle 90 acres of row crops. Some well!

The excavation of a new intake channel at the North Sterling reser-
voir is nearing completion. The work of raising and reinforcing the dam was completed some time ago.

Alvin H. Wedemeyer has purchased a fine all-crop harvester and now is busy harvesting crops throughout the district. Mr. Wedemeyer grows beets in the Fromberg, Montana, district.

Mr. and Mrs. M. D. Harris, prominent Lovell, Wyoming pioneers celebrated their Golden Anniversary September 5. Mr. Harris has taken an active part in the development of Lovell and its vicinity since 1902. Besides being known as an outstanding farmer and cattle man, he is also recognized as the first successful fruit grower in northern Wyoming.

Miss Irma Raichert, daughter of Mr. and Mrs. Charles Raichert of Gering, recently became the bride of Cecil Wrenn.

Extreme dry weather has created several unusual problems for farmers who are preparing land for next year crops. Charles N. Lucas, farming L. P. Bear's place near Berthoud, has found it advisable to double disk before and also after applying manure in order to have the soil in suitable shape to plow. The result should be a well-prepared field after plowing.

Bert Stone, Hartman station, Lyman, is moving and enlarging his cattle corrals for use this winter.

The W.P.A. has started driving the piles for a weir type dam across the Yellowstone river at the intake of the Waco-Custer ditch. The dam will insure the farmers of that district an adequate water supply throughout the season.

George Klein of Redmond district has moved to Denver to supervise the farm of the Bellview College.

The interest that is taken by the young people on the farms in live stock and other activities is demonstrated by a son of J. Arthur Anderson, a member of the Twin Mounds 4-H club, who had two club calves entered at the Larimer County Junior fair and was awarded the grand champion prize. No doubt young Anderson will make a strong bid for the same prize at the state fair.

Art Steyaert of the Balzac station at Brush has completed fall plowing on 40 acres.

R. Vernon, Sedgwick, brings home the bacon in the 4-H hog division at the Sedgwick County fair. His fat hog won grand champion ribbon.

The Eaton Chamber of Commerce sponsored a farm tour August 14. Merchants of Ault and Eaton were directed through 50 miles of farming lands adjacent to the two towns. Striking contrasts were noted between farms with ample water and ones with an inadequate supply.

W. F. King and son Francis, Joyce station, Lyman, have just completed another irrigation well on their north farm.

Some very good yields of potatoes have been reported by Milliken growers. Jake Stroh had a yield of 255 sacks per acre. Spuds are very good in a crop rotation where they can be grown and it gives the grower a place to spread the manure and fall plow the land for next year's crop.

The Windsor 4-H club, under the able leadership of Club Leader Casey Greenwald and Club President Caro-
line Greenwald, brought home the bacon at the Junior state fair at Greeley August 16-17, winning seven free trips to the state fair at Pueblo.

Raymond Frank and his prize Shorthorn.

Raymond Frank, member of the “Oklahoma District” 4-H Club, won first prize at the Junior State Fair in Greeley with his Shorthorn calf. The calf weighed 765 lbs. when shown and had gained at the rate of 2.6 lbs. per day. The “Oklahoma District” is just south of Windsor.

Jimmy Yasuda, Platteville, took first on 700 to 800-pound Hereford steer at Weld County Junior fair at Greeley.

Henry Gams of Kane, Wyoming, is rapidly building up a farm flock. He has found sheep raising both interesting and profitable.

Raymond R. Ramey, Padroni landowner and merchant, recently negotiated the purchase of the two Haley-Smith Company farms lying just below the North Sterling outlet. These choice farms contain in excess of 400 acres of irrigated land.

Roy Shull, Joyce station, Lyman, is drilling an irrigation well on the farm he operates.

Another noxious weed that has been on the increase in the Loveland district the last few years is called White Top. This weed is as bad as if not worse than bindweed. Ben H. Gregg, farming the Pulliam place at Elwell, is controlling a large field of this weed by clean cultivation.

Carl Ungefug, prominent Belfry, Montana, grower, has just completed repainting his fine home, barns, granaries and corral. This neatly painted home set in a surrounding of blue grass pasture and two fine fields of sugar beets now presents a fine picture.

An excellent irrigation well has been installed on the Cliff Otte farm east of Scottsbluff. The well is equipped with an 8-inch electrically-driven pump, pumping 1,200 gallons per minute, but authorities say it will produce up to 2,400 gallons per minute.

Julius Sabe, late of Pompeys Pillar, Montana, one of the best farmers in the district, was laid to rest August 28. He leaves to mourn his going a widow and eight children, besides a host of friends in the Billings district.

John Matsushima, Platteville, took first on 800 to 900-pound Hereford steer, also first on group of three steers, at the Weld County Junior fair at Greeley.

Harold Maul of Timnath has returned from Washington, where he was one of the Colorado 4-H representatives.

Harold Carter, Jr., of Powell, Wyoming, won the grand champion prize in the Junior Live Stock fat calf show at the Big Horn Basin fair with his Angus calf. Cal Taggart of Cowley, Wyoming, won 2nd prize with his Angus calf. Homer Mann, a Powell attorney, was the breeder of both calves.

Jacob Betz, Loveland grower, has a well established system of getting his
fall plowing under way. His water right in Ish lake gives him sufficient water to irrigate all of his stubble land. All straw hauled to his feed lots is kept moist by turning in water at least every 10 to 12 days and milk cows and horses keep it well packed down during the whole year. Manure is applied before irrigation and fall plowing follows under ideal conditions.

A. J. Higbee has a wonderful prospect on 32 acres of beets planted on alfalfa ground fall plowed and manured. This field was fall irrigated and also irrigated up. Mr. Higbee farms near Trowel in the Brush territory.

Gerald Williams, Sedgwick, won first place in the white face 4-H baby beef class at the Sedgwick County fair.

Joe and Harry Long and their families, of Lyman and Morrill respectively, attended the World’s Fair in New York the first part of July. They traveled with the Cornhusker tour.

Charles Urano, Platteville, took first on Spotted Poland China gilts and junior litter at the Weld County Junior fair at Greeley.

John Schloo of the Brighton district has put down a well and got a good flow. This will save his 12 acres of beets and truck crops.

J. R. Daugherty and son, Ray Daugherty, Belfry, Montana, growers, recently made a trip to Kane, Wyoming, to inspect, weigh and prepare for sale their crop of lambs. The band of sheep is wintered on the Daugherty farm where an up-to-date feeding and lambing shed is maintained with adequate windbreak corrals.

Mr. and Mrs. Lemley, of the Lake Alice community (Scottsbluff territory) are taking an extended trip through the west and northwest.

H. J. Otte is drilling an irrigation well on his farm just west of the Marlin beet dump, in the Scottsbluff territory.

Nicholas E. Debras dug an irrigation well for his tenant, C. A. Markley, Platteville.

H. N. Williams of Powell, Wyoming, is what several communities would call a master farmer. Each year his name bursts out in print because of some high attainment agriculturally. This year he threshed a fraction of a bushel over a hundred bushels of barley per acre. By the way, this barley was only a nurse crop for a good stand of alfalfa. This land was previously in sugar beets.

A cave-in on the irrigation well of E. F. Pieper, in Mitchell Valley, was immediately taken care of by drilling another very good well.

Bob Moninger of Harmony will enter Aggies this fall after working on his father’s farm since graduation from high school.

First, second and third prizes went to T. Koshio, George Coburn and Joseph Schenfeld respectively in the fine agricultural exhibit on Tomato Day August 12 at Fort Lupton.

Mrs. Ed Van Dierendonk, Billings district, has returned home, having been in the hospital for the last month.

The engagement of Miss Josephine Westerdoll and Jack Crane has been announced. The young folks are residents of Fort Collins district and have lived on farms in this district since childhood.

Forrest Schmidt, son of Wm. Schmidt, Fort Lupton district, won first place with his fat Angus steer at the Weld County Exhibit of 4-H work.
Harry Spillman, of Julesburg, recently completed 29 years of delivering milk to Julesburg residents when he sold his Holstein dairy herd August 11. Although Mr. Spillman doesn't have to begin milking every morning and evening at 4 o'clock now, he says he is still just as busy as ever. Mr. Spillman has over 60 acres of very good beets this year.

Many farmers in the Lyman district under the Mitchell ditch are busy installing irrigation wells to supplement the water shortage in that district. The wells range from 10 to 50 feet in depth with plenty of underflow assured. Growers who are pumping water are Jacob Maul, Herman Weinmaster, George Strecker, Henry Wilhelm, Jim Hayano, Ben Karst, and Jim Miyahara. Others planning to irrigate from wells are James Byrnes, Pete Schamber, K. Kakuda, Jack Kreuger, and Stanley Evans.

The Wm. Birkle Estate dug an irrigation well for their tenant, Jake Adler, in the Platteville district.

Gus Gremel of the Brighton district is getting ready to follow his usual custom of plowing under his bean crop for beets in 1940.

Carl Wegner at Laurel, Montana, who bought the Jake Ellis farm last spring, has just completed a new addition on his house. Carl believes in having a nice place to live.

Fred Quindt, Conrad Propp and S. H. Kuntz, growers at Scottsbluff factory station, are constructing new potato cellars.

Margaret Prendergast McLean, a former resident of Harmony district, has been visiting her brothers here this summer. The last several years she has been teaching at Columbia and New York universities. September 1 she will leave for Hollywood to become instructor in the dramatic school. Mr. McLean is with the Quaker Oats Company of Chicago.

The total number of irrigation wells in the Big Springs, Megeath and Brule area has been boosted to 75 with the completion of new wells on the Geo. McGinley and Orville Beal farms at Brule.

Gust Anderson, near Lyman recently topped the Omaha market with two carloads of choice fed steers and heifers.

Melvin Walker, Platteville, took first place on Cobbler potatoes at the Weld County Junior fair at Greeley.

August Engdahl put down an irrigation well for his tenant, Thomas Lopez, at Platteville.

Douglas Hause, graduated from Brighton High in 1939, son of R. A. Hause, will enter Colorado State college for a veterinary course.

Fred Schott, on the J. W. Birkle ranch at Vasquez station, took first place on beets shown at Platteville Pickle day.

Philip Hart of the Hart Farm company is about to complete a new house on his farm on the cemetery road west of Billings.

Jack Lewis of Washington, D. C. is visiting his parents, Mr. and Mrs. John H. Lewis of Timnath. Jack is in the patent office and is an ex-Aggie.

The Lakeside and Kiowa 4-H Live Stock clubs adjoining the Lyman factory have been progressing very nicely this summer. They both have promise to take home some of the blue ribbons to be offered at the Scottsbluff County fair to be held in Mitchell from Sept. 13 through Sept. 16.

The Milliken Brothers of the Brighton district have just brought in a fair well, endeavoring to save 17 acres of beets.
Table of Contents

War in Europe .......................... 147
Fall Land Preparation for Sugar Beets—A. C. Maxson and H. E. Brewbaker .......... 148
Smothers Bindweed With Manure ................. 150
Shake Hands With the Lackman Boys! ............ 151
"Plow Now for 1940" Is Slogan ................ 152
John Was Using His Axe! ........................ 155
Montana Develops Decentralized Feeding—E. J. Maynard ............... 156
U. S. Tests Show Highest Yields from Manured Rotations—Dan Hansen ............. 159
Fall Preparation Means Better Seed-Beds ........ 160-161
Changes in Factory Management ................. 162
Around the Territory ........................ 165

The Great Western Sugar Co., Longmont, Colo.
Streamlined trains don’t wait! You have to be at the station on time to catch them. And being on time is just as important in securing high yields of sugar beets or any other crop. Will your seed bed be ready early for 1940?

NOVEMBER, 1939

THE GREAT WESTERN SUGAR CO.
Your sugar—and no other sugar—is the right sugar for your community. If other sugar comes in, it forces a like amount of G-W to seek a market elsewhere—resulting in lower net return to Company and Farmer.
As we went to press, basic raw sugar prices were back in the cellar again, with Washington sitting on the trap door.

On August 1 the duty-paid raw sugar price was $2.90, and on October 30, the price was $2.90 again. On November 6, prices for future delivery were actually lower than in the first week of August. A hysterical public, following declaration of war in Europe, had purchased enormous quantities of sugar. Efforts to reassure the public that there was plenty of sugar on hand appeared to have little influence.

The administration took action on September 11. The president issued a proclamation temporarily suspending all quotas, while the duty on Cuban sugar coincidently became $1.50 per 100 pounds, raw value. An intense effort commenced immediately by some interests to have this reduced to 90 cents.

Following this governmental action, basic raw prices fell back to levels prevailing before hostilities. Retail prices, moving slower, were settling back.

Administrative action to curb a price improvement had the very definite effect of confronting the beet industry with new uncertainties.

What would be the next development? Would the tariff be reduced? Would it be a long war? Would prices go still lower? Was other unforeseen action contemplated? One man’s guess was as good as another’s. And so the matter rested as we went to press.

It was, however, increasingly clear that the Sugar Act of 1937, whatever the intent of those who framed it, subjects a large and vital industry to guessing as to the time and effect of determinations of government officials.

The present Act expires in 1940. Farmers, processors, senators and congressmen are studying the problem. No concrete program to date has emerged from these discussions, but in all quarters is felt the need for some program under which the number of un-predictables will be reduced.
Crop estimates, as the last beets of the 1939 harvest were being delivered, indicated an average yield of 11.28 tons per acre for Great Western territory as a whole.

Windsor had the highest yield with an average of 13.48 tons per acre; Eaton, second, 12.67 tons; Lyman, third, 12.19 tons; and Brush, fourth, with 12.14 tons.

The average acre yield for Colorado was estimated at 11.10 tons; Nebraska, 11.67 tons; Billings, 11.86 tons and Lovell, 12.26 tons.

Contracted acreage in 1939 was 25,000 acres larger than in 1938; but approximately 35,000 acres were lost because of drouth and water shortage between contracting and harvest. Approximately 211,000 acres were harvested.

Favorable winter precipitation, with encouraging reservoir supplies, gave way abruptly at the planting season to drouth which, in some districts, was without precedent.

High yields—up to 20 tons per acre or more—were harvested by individual farmers where the crop had a good start and adequate moisture.

In no recent year has the importance of timely work been more evident. Farmers who were able to have their crop planted on good seed beds in time for germination by late spring moisture, secured good stands.

Stands were seriously reduced on fields planted as the dry spell was setting in. Irrigation for germination was necessary.

The practice of irrigating up, which has become standard practice in recent years under conditions requiring it, proved the difference between a beet crop and no crop at all on many farms.

Had such drouth conditions been encountered in the older days of beet growing in this area, when irrigation for germination was not practiced, and first irrigation postponed until about the 4th of July, much larger abandonment of acreage would have ensued.

While average acre yields are below the outstanding yields harvested in 1938, the 1939 sugar content in all Company districts is higher than in 1938.

Difficulties in getting the 1939 crop started have resulted in special effort to prepare more seed beds earlier for 1940. Despite the dryness of the soil, many acres have already been fall plowed; and where conditions were not favorable for plowing, much disk ing of stubble has been done.

Disking puts the soil in good condition for plowing at the first favorable fall of moisture, and has added advantages: earlier decomposition of organic matter, sprouting of volunteer grain and weeds, and exposure of grasshopper eggs to the elements.

If open weather continued after beet harvest, it was expected that increased acreage of land would be plowed for 1940.
The Proof of the Pudding Is in the Eating

By E. J. "JACK" MAYNARD

"O UR beet-pulp-fed bulls averaged $230 at the sales this spring, and this set of bulls shows better gains and more profit than any that we have ever fed," writes Eaton Becker, manager of the Becker Hereford ranch at Wilso ll, Montana. "We feel that dried molasses beet pulp has been one of the greatest helps to the feeder of live stock found in recent years," he continues in a recent letter.

"We fed our calves beet pulp pellets on the range last winter," writes Jack Arnold of Birney, Montana, president of the Montana Stockgrowers Association. "As yearlings this fall they weighed 742 lbs. compared to 695 lbs. for last year's crop," he continues. These are only two of hundreds of stockmen who have found that dried pulp added to the ration eliminates indigestion and bloat and exerts a physiological value that produces heavier and more profitable gains on cattle.

The Montana State Agricultural College used dried molasses beet pulp with ground barley in a recent fattening experiment with calves. Feeding equal parts by weight they produced nearly 100 lbs. more gain per head in a 224-day fattening test at a lower cost per unit of gain than when feeding steamed rolled barley and alfalfa alone.

The U. S. government range experiment station at Miles City, Montana, has been conducting some fattening tests with calves to study the influence of sires on the gaining capacity of their offspring. Their early results were affected by digestive troubles encountered on a ration of straight grain and alfalfa.

Last year they started mixing dried pulp with their ration and eliminated this trouble.

Each year more beet growers are learning the true value of dried molasses beet pulp when added to their home-grown rations of grain and hay to produce a safe and efficient fattening ration for livestock.

Rene Grammens, beet grower at Custer, Montana, is one of many who are successfully producing choice-grade baby beeves on the farm each year with a combination of grain, hay, beet tops and dried pulp.

Not only beef cattle but lambs and dairy cattle as well make a remarkable response to the use of this nutritious and stimulating root crop in their ration. Here in the Yellowstone Valley lambs fattened with oats, dried pulp and alfalfa hay are regularly producing market gains of from 10 to 12 lbs. per head per month and with practically no death losses.

Dairy cattle already on a well-balanced combination of feeds have shown actual increases of 12 to 15 per cent in milk flow when dried pulp has been added to their rations.

A survey of many feeding operations during the past 3 years has indicated that dried molasses beet pulp, which has a nutrient value comparable to the small grains, exerts a definite beneficial physiological influence which makes it worth considerably more than grain, pound for pound.

J. F. Loose, east of Fort Morgan, had one of the best beet crops in the territory. Jake irrigated his crop up early and got better than 20 tons per acre. Jake states that an application of 15 tons of manure to the acre, along with timely operations and irrigations, helped to produce his high field on a 21-acre contract.
Coach J. V. Ostermiller, the fellow with the pencil, is planning final strategy with his Colorado Champion Stock-Judging team as they go into action in the National competition in Kansas City. Left to right—Al Lenhart, Ed Christensen, Ostermiller, Dan Bostron and Bob Oldemeyer.

Colorado Stock Champs Do Well at Kansas City

Brush's state championship livestock judging team brought honor both to their school and state at the National Livestock Judging contest at Kansas City. The Brush team placed second in beef judging and seventh in the general contests including every division. The Brush boys competed among 35 teams, each a state champion. Brush won the Colorado championship at Fort Collins last year. The national contest was held in connection with the American Royal Stock Show and convention of the Future Farmers of America in Kansas City.

The Brush high school team included Al Lenhart, Ed Christensen, Dan Bostron, and Robert Oldemeyer, alternate. The team was coached by J. V. Ostermiller, and accompanied to Kansas City by Charles Painter, Colorado state president of the Future Farmers of America.

Beet growing families were well represented. Dan Bostron is the son of Conrad Bostron, Al Lenhart son of Jake H. Lenhart, Ed Christensen, son of Fred B. Christensen, and Bob Oldemeyer is the son of Clarence Oldemeyer. Charles Painter is the son of C. O. Painter.

Hygiene and Niwot beet dumps have both suffered on beet deliveries due to an epidemic of buck fever among a big part of the growers. After the deer season was over we got in a reasonable amount of deliveries at those dumps.
Wyoming sunshine and Sunshine dam, with construction nearing completion, will work together to produce irrigated crops on 59,000 acres in 1940.

Large Irrigation District Completed in Northern Wyoming

The Sunshine Dam of the Greybull Valley Irrigation District, costing $1,108,000, is now virtually completed, and water is being stored back of the dam for use in 1940 on approximately 59,000 acres of land in the Greybull River Valley.

The project has been dreamed of for a great many years, and furnishes a supplemental storage supply for the Emblem Bench and the section along the Greybull river around Otto and Burlington. Actual construction started in March of 1938.

Howard Bell of Cody was chief engineer, and L. R. LaFleur chief engineer inspector, appointed by the PWA. The dam itself is of compacted earth construction, with each cubic foot of earth compacted to weigh around 120 pounds. The face of the dam is rip-rapped with flagstones. The dam is over 1,000 feet long and about 900 feet thick at the base.

In connection with the project a concrete diversion dam, 250 feet in length, was constructed across the Greybull river below the Z-T ranch buildings. An 8-mile supply canal was constructed leading over to the reservoir site. The dam site is located on the famous Pitchfork ranch above the early cattle town of Meeteetse.

George H. Stearns was chairman of the Greybull Valley Irrigation Company, and other board members are M. J. Donovan of Meeteetse, and Joseph Christie of Otto. The new district has been formed for a great many years, and was originally organized in 1920.
IT'S A WISE FATHER THAT KNOWS HIS OWN SON—and particularly his son's, very efficient feeding methods—and his daughter's, too, because boys and girls all over the West are coming rapidly to the front as expert feeders, farmers, and masters of practical agriculture. These pictures were taken at the Regional Junior Fat Stock Show recently held at Billings.

The upper picture shows part of the 845 fat calves exhibited by 4-H Club and Future Farmers of America boys and girls, and below are the youngsters with the ten Prime calves, left to right: Vic Eisenman, Park City, Mont.; Albert Cole, Red Lodge, Mont.; Marjorie Ginther, Hedgeville, Mont.; Gene Coombs, Laurel, Mont.; Marie Monforton, Gallatin Gateway, Mont.; Arthur Jacobsen, Clyde Park, Mont.; Margaret Monforton, Gallatin Gateway; Virgil Iseb, Wilsall, Mont.; and Terrell Gibbons of Worland, Wyo.
Growers’ Children Compete in Fat Stock Show

HERE were 345 fat calves, 446 lambs and 190 hogs from Montana and Wyoming exhibited and sold by farm boys and girls at the 2nd annual Regional Junior Fat Stock show sponsored by the Billings Commercial club and held at Billings October 23, 24 and 25. No champion ribbons are awarded at this show but all animals are graded prime, choice, good and medium, then sold at auction the closing day of the show.

Many youngsters of beetgrowers from both Billings and Lovell districts won honors at the show.

In the cattle division there were 10 calves graded prime, 42 choice, 186 good, 102 medium and only 5 sifted. Gene Coombs of Laurel and Vic Eisenman of Park City exhibited calves that were graded prime.

Choice calves were shown by George Frank, Howard Horton, Dan Nafts, and Ralph and Tom Barkemeyer of Huntley, Lena and Nellie Berkmoe and Frank Shupak of Bridger, Bill and Gene Coombs and Clarence Rupp of Laurel, Henry Young of Joliet, Everett Sanderson (2), Arthur and Rynault Kaufman of Billings, Joe and Vic Eisenman of Park City and Bill Franklin, Wilbur Reed and Hershel Eggerman of Powell, Wyoming.

Prime fat lambs were exhibited by Bill Fox of Laurel, Elmer Severson of Huntley and Harry Sitzman of Park City. Harry also won a championship ribbon for showmanship in the lamb division. Others who exhibited lambs that graded prime were Joe and Vic Eisenman of Park City and Raymond Rapstead, Gerald Everett and William Rieman of Ballantine. Choice lambs were shown by Walter Heald of Belfry, Evelyn and Fred Young of Joliet, E. W. Brown of Bridger, Gene Coombs of Laurel, Stan Everett of Ballantine and Eugene Severson of Huntley.

Choice barrows were shown by Deward Busha and Willard Riemann of Ballantine, Eugene Earhart and Hershel Eggerman of Powell. Joe and Vic Eisenman of Park City, Bessie Boyer and Wallace Guptill of Custer, George Frank, Howard Horton and Dan Nafts of Huntley, Thomas McClure Jr. and Clarence Rupp of Laurel.

A strong buying power was evidenced at the sale where local and central market representatives and others interested in encouraging the development of live stock feeding among the 4-H and F. F. A. youngsters paid a total of $36,317.33 for the stock sold, netting a nice average profit for the boys and girls who fed it. Cattle sold from $8.50 to $15.00 per cwt.; lambs from $9.00 to $25.00 per cwt., and hogs from $7.00 to $11.00 per cwt.

Prior to beet harvest Axel Sarin of the Longmont district had already hauled out 19 acres of manure at the rate of 11 loads per acre and was planning to continue plowing for 1940 as soon as his beets were pulled. Axel has been growing beets since 1917. He believes in fall plowing. On October 25 he estimated that his beets on fall plowed bean ground were running about 4 tons per acre higher than on ground that had been in beets last year.
Fifteen years of road-contracting work and familiarity with road-building equipment served Fay Garner of Longmont in good stead in inventing and developing a new type of loader used for loading beets from piles. Mr. Garner's invention involves the principle of a material loader mounted on a caterpillar.

The loader takes about 3½ tons of beets at one scoop from the pile and carries the beets overhead and dumps them into the car. One machine, according to Mr. Garner, can handle about 3,000 tons of beets per day. Eight of these machines are being used in Great Western territory this year and three in Utah-Idaho territory. J. H. Monahan has the contract for loading the beets.

The idea of this beet loader had been in Mr. Garner's mind the past seven years, but he had only worked on it intensively the past three years. At one stage, he used the principal for loading wet pulp out of the silo.

The cheery "hello" of Emil N. Johnson was missing around the Leyner dump, Longmont, this fall. He has been working too hard this summer and has got an excellent beet crop, but the family doctor said he must rest and put him to bed. Emil will soon be around again but in the meantime Wallace Almquist has been seeing to it that the harvest goes along.
THE farmer who produces sugar beets has long since learned that the old-time, careless methods of handling beet tops were wasteful and expensive. Realizing that he does have a valuable source of additional roughage for his feeding and fattening operations he is now interested in how much additional roughage he can expect from his beet tops; the best method, or methods of storing and handling this supply of feed; and its place in his feeding operations.

Colorado farmers produce about two million tons of sugar beets each year, and have from one and one-third to one and one-half million tons of green tops to handle or store, and use. Since cattle are used principally to consume these tops, the Colorado station, in an effort to determine the true feeding value of beet tops, carried on two rather extensive fattening experiments with steers in 1936 and 1937.

The results of these experiments showed that for each 1000 pounds of beets produced the farmer can expect approximately 640 pounds of green tops at topping time, containing 80 per cent moisture. These tops if piled in the field will lose about ten per cent moisture each week for about four weeks, then lose moisture slowly until the very dry stage, about 20 per cent moisture, is reached. Because of this moisture loss the farmer will have, from each 1000 pounds of beets produced, about 430 pounds of tops one week after topping, 320 pounds of wilted tops at the end of two weeks, 260 pounds at the end of the third week and 210 pounds of dried tops, 40 per cent moisture content, at the end of the fourth week.

OF THE several methods of storing and handling the beet tops for the cattle feeding experiments it was found that tops are more valuable as beet top silage when stored during clear, dry harvest weather and more valuable when piled in small piles after harvesting during wet stormy weather, and fed later as dried beet tops. This is due to the fact that dirty or muddy tops put into the silo will keep the dirt, and the cattle are forced to consume this incorporated soil along with the silage. Dietary troubles will then probably occur. Most of the dirt will drop out when handling dried tops, or will be left in the feed bunks by the cattle.

When storing beet tops in the silo they should be put into the silo as quickly as possible after topping. Chopping or other treatment is unnecessary. Since it is impossible to get the tops into the silo without some moisture loss, the amount of silage secured from 1000 pounds of beets will vary somewhat. The silage used in the 1937 steer fattening experiment averaged 72 per cent moisture. On this moisture basis the farmer can expect about 500 pounds of beet top silage for each 1000 pounds of beets he produces. For example, a field yielding sixteen tons of beets would produce about eight tons of beet top silage.

The waste in storing and feeding beet top silage during these experi-
ments was small, only .55 of 1 per cent. This silage was stored in an upright concrete silo, and beet top silage in other types of silos would probably show a larger percentage of waste. Beet top silage is easy to handle and should be fed in much the same manner as is customary to feed corn silage.

Beet top silage ranked next to dried tops in the smallest loss of nutrients during storage. The loss of nutrients in beet tops when stored in the form of silage was 1.63 per cent protein, 8.81 per cent nitrogen-free extract, and 1.1 per cent fat. Fiber increased 2.68 per cent. The high increase in ash content, 8.81 per cent, was due to incorporated soil. For dried tops the protein loss was only 0.88; fat and nitrogen-free extract showed a loss of only 0.30 and 1.17 per cent respectively. The ash content showed only a minimum increase of 3.25 per cent because repeated handling tended to separate the soil from the tops.

From the results of these experiments it cannot be recommended that beet top silage be used as a substitute for wet beet pulp in a standard beet by-product ration of ground corn, cottonseed cake, wet pulp and alfalfa hay. However, good results were obtained when beet top silage was used as a supplement to wet beet pulp. In the 1937 experiment when clean beet tops were stored, each ton of beet top silage fed with wet pulp replaced 540.73 pounds of alfalfa and 1.61 pounds of salt but required 72.18 pounds more corn, 8.06 pounds more cottonseed, and 225.40 pounds more wet beet pulp. With feed prices at $24.00 per ton for corn, $40.00 per ton for cottonseed cake, $1.50 per ton for wet pulp, $12.00 per ton for alfalfa hay, and $14.00 per ton for salt, each ton of beet top silage would have a replacement value of $2.05. When added to a dry ration beet top silage adds succulence and palatability to the ration and apparently makes a very satisfactory roughage.

When feeding beet tops to fattening steers a few ordinary precautions should be kept in mind. Beet tops are a relatively high mineral-carrying feed. The salts present in tops are cathartic and tend to cause scouring unless the quantity of tops fed is restricted; or lime (CaCO₃) is added. This lime may be added to the ration at the rate of one-tenth pound per head per day, sprinkled over the silage at feeding time. This will rather successfully control scouring. Beet top silage is apparently very palatable to cattle for they would leave all other feeds alone if any silage was available. Therefore, the beet tops should be fed in controlled amounts.

Jake Amen is moving to one of the George A. Henderson Co. farms near Iliff, Sterling district, on which a new farm house, beet house, and barn, were just built. Mr. Amen has his fall plowing out of the way.

Two Longmont growers, John E. Clark, Morey district, and Lynn W. Clark, Grenfell district, recently purchased 295 head of heifers from former Governor Sweet, on his ranch at Falcon, Colorado.

Dwight and Vance, sons of Mr. and Mrs. F. D. Pumphrey, Hartman station, Lyman, have enrolled in the agricultural department at Nebraska university, where Dwight is a sophomore and Vance a first-year student.
When government pictures are available they will show some of these scenes taken by our own photographer while Arthur Rothstein, government photographer, shown below, was shooting August Ehlen and his beet workers.

**Ehlen Featured in U. S. D. A. Photographs**

**IF YOU** go to Washington and ask the Department of Agriculture to show you some photographs of how sugar beets are harvested, they will show you pictures taken on the farm of August Ehlen near Brighton October 12, 1939.

Mr. Ehlen's operation was selected by Arthur Rothstein, photographer for the department. Mr. Rothstein explained that the department is building up a large file of pictures on all agricultural activities in America. Having taken pictures in every state in the Union, Canada, and Mexico, Mr. Rothstein came to northern Colorado from the San Luis valley, where he had photographed potatoes. He was next scheduled to photograph the corn harvest in Iowa.

He took many pictures on Mr. Ehlen's field showing plowing out, pulling, A-ing out, knocking beets together, topping, forking beets into truck, and hauling them to the Henderson dump. Various pictures were taken of the piler at the dump, then Mr. Rothstein took another series of pictures showing the factory side of the beet operation. The negatives were sent to Washington where they became part of the permanent government file.

Axel Anderson, right, shows Fieldman Fred Law why it pays to have a good well on the place.

A good irrigation well, combined with good farming practices, pays dividends to Axel L. Anderson, prominent beet grower, in Kuner district at Greeley.
Some of the outstanding potato growers of Weld county. (1) George Mosier, Greeley, holding three large Katahdins. (2) Close-up of a row in a 700-bushel field. (3) J. Ben Nix holding a Chippewa potato weighing 2 pounds 9 ounces. (4) John H. Eckhardt, Jr., who grew on one of Harry Farr’s farms in 1939 over 20 tons of beets, 53 bushels of beans and 613 bushels of potatoes per acre. (5) The three Jerke Brothers in the foreground and James Stewart sitting on the right of the sorter. (6) Frank Eckhardt, who harvested 702.8 bushels per acre. (Photographs (1), (2) and (3) courtesy of The Tribune, Greeley.)

Weld County’s 600-Bushel Potato Club

Members Follow Proven Farm Practices

HIGH yields of potatoes and sugar beets go hand in hand in right rotations on favorable soils in Weld county.

Below is a list of eight members of the 600-Bushel Potato Club whose yields were measured and certified to by County Agent L. V. Toyne of Greeley, Colorado:
An examination of the cropping plan of these successful potato growers shows that in general they all follow from seven to nine-year rotation plans that include alfalfa, potatoes, beets, corn, beans and small grain, with applications of manure to the row crops. Most of the above growers have an enviable record as high-tonnage beet growers.

The first of these men, Mr. Frank Eckhardt of La Salle, Colorado, harvested 702.8 bushels or 421.7 sacks of Bliss Triumph potatoes per acre. Plenty of water, manure, commercial fertilizer, a well planned rotation and good farming are factors necessary to produce a crop that qualifies for Colorado’s 600-Bushel Club.

Mr. Eckhardt’s rotation of crops consists generally of three years of alfalfa followed by potatoes, then beets or corn, then a second crop of potatoes, again followed by corn or beets, after which the field is seeded to alfalfa with barley as a nurse crop. Manure is applied each year to the land prior to planting the potatoes, beets and corn. The application of 200 pounds per acre of ammonium sulphate as a side dressing was put on the potato crop this year on July 3.

The Jerke Brothers, Ed, Harry and Albert, produced 678.66 bushels of Triumph potatoes per acre on one of the James A. Stewart farms one mile south of La Salle, Colorado. This crop of early potatoes equalling 409 sacks per acre, qualifying them for the 600 Bushel Club, was sold for $1.50 per cwt.

These men have farmed on this place for the past eight years, building up its fertility and productivity with the cooperation of their landowner, Mr. James A. Stewart.

As well as the potato crop, all other crops are outstanding on this farm. This season, 40.2 acres of sugar beets yielded an average of 17.11 tons per acre. The alfalfa crop normally yields five tons per acre.

The rotation followed on this farm is two years in alfalfa, one year in potatoes, two years of beets, the second crop being well manured, and then seeded back to alfalfa with barley as a nurse crop.

John H. Eckhardt of Lucerne, Colorado, farming one of the farms owned by H. W. Farr of Greeley, produced 613.22 bushels of Katahdin potatoes per acre. Mr. Eckhardt had 47 acres of potatoes this year as well as 43.2 acres of sugar beets.

In 1938 Mr. Eckhardt harvested an average of 23.36 tons of beets per acre from 46.7 acres. He had not at this time completed harvesting his 1939 crop of beets but it was expected that it would be among the highest yields again.
To produce these exceptional crops, Mr. Eckhardt plans a careful rotation of crops which generally consists of alfalfa three years, followed by potatoes, then beets followed by either beans or potatoes, after which the land is seeded to alfalfa with barley as a nurse crop. Manure is applied to the potato, beet and bean crops.

J. Ben Nix, one of Eaton's outstanding farmers, qualified as a 600-Bushel Club member with a production of 625.2 bushels of potatoes per acre on the Harry W. Clark farm. Mr. Nix follows a rotation of four years alfalfa, potatoes, one year, followed by beans or beets, then a year of potatoes, followed by beets or beans and then seeded back to alfalfa with a barley nurse crop.

Mr. Nix has just completed the harvesting of a high yielding, high sugar content beet crop.

Favors Beet Top Pasture for Breeding Ewes

R. A. BRACKENBURY of Fort Collins, who produces about 2,200 lambs a year, has found beet tops to be more satisfactory than range grass for ewes during the breeding season.

In recent years Mr. Brackenbury has compared results secured on his ranch 30 miles north of Fort Collins, where the ewes were on range grass with cotton-cake, with results obtained by pasturing ewes on beet tops. He finds that the beet tops contribute to higher per cent of twins and less dry ewes.

It is his current practice to bring the ewes down from his ranch and pasture them on tops for a while before turning in the herd bucks. The tops build up their condition. The slightly laxative effect of the tops is helpful, in his opinion.

The ewes are pastured on beet tops about six weeks, beginning before mid-December until late January; then they are returned to the ranch where the lamb crop comes on in May. Mr. Brackenbury has docked as high as 120 lambs to 100 ewes after pasturing on beet tops during the breeding season—a percentage he has not been able to achieve on range grass.

He keeps his herd bucks—Hampshires, Corridales and Rambouillets—in Fort Collins during the winter.
Close Stand Aids 23-Ton Yield

"NO MORE wide spacing for me!"

These were the words of Harold W. Anderson of Walker station in the Longmont district upon learning that the beets he took out during the first two weeks of harvest yielded better than 23 tons per acre with an average sugar content of 17.5 per cent.

In the past years prior to 1938 Harold always had his beets spaced between 14 and 16 inches. Last year he decided he would try the ten-inch spacing. His yield for that year was 22.71 tons and sugar content 16.2 per cent higher than the station and factory average.

Last fall Harold plowed under eighteen loads of manure per acre on his pea ground. His beets were planted April 26 and all thinned by June 10 with workers instructed to leave 10 inches between beets. The first irrigation was applied June 16, the second the middle of July, and the third and last one August 16.

John Weng, west of Hygiene, brought home a fine deer during the recent season.

Aksel Sorensen, Adolph Walker, J. M. Rudolph, Fred Lindell, John Oldemeyer, Harry Bollinger, Lloyd Parkhill, William Freihauf and Clem Speer were among the first Brush growers to receive their lambs.

J. L. Brown, Brule, Nebraska, is completing a new irrigation well on a quarter of land he purchased last spring.

Rotation is a slow school, but nematodes will learn in no other. William E. Schreiner of Wellington is showing some of his friends how he got a good beet crop this year after controlling nematodes by rotation. He’s holding up a good beet and comparing it with a nematode beet which showed up on one small patch of his field.
Joe Lammers at Johnstown put five horses on the plow and plowed an 18-acre field about 11 inches deep. This will make a very good field that will be ready for next year's crop.

W. J. Harding, who for many years fed cattle for the Great Western Sugar company at Fort Morgan, has been taking treatments at the Thermopolis Hot Springs in Wyoming. His many friends will be pleased to know that he is responding to the treatments in a very satisfactory manner. At home Mrs. Harding was supervising the harvest of one of the best crops of beets the farm has produced in many years.

Growers at several of the Ovid receiving stations have been weighing the large beets found in their fields. To date, R. Nein of Sedgwick tops the list with a 17-pound, 1-ounce beet; Dave Todd of Crook, 16-pound, 8-ounce; and Geo. Peterson of Chappell 15-pound, 15-ounce.

LeRoy Dietrich, Moon dump, Gering, says his "beet loading machine takes all the backache out of beet harvest." This machine loads five tons of beets on a truck in six minutes.

F. E. Buckingham has completed a new well on his Wiggins Farm, Fort Morgan district. This makes two wells with a capacity of 2,800 gallons per minute on this farm, and should supply ample water for all crops.

Mark McConnell is delivering his beets at the O'Fallons station for the thirty-second year. Mark says "He sure has hauled a lot of beets over the old Highline dump."

William E. Schreiner, Wellington, has demonstrated by crop rotation how beets may be grown successfully on nematode infested land. His excellent beet field this year has only one small patch showing nematode damage.

The North Platte Valley Poultry Association conducted a very successful turkey grading school at Henry (October 9-10) with a large attendance. H. V. Anderson of Henry helped make arrangements for the grading school.

Our sympathy is extended to C. M. Matheny of Morrill, Nebraska, and to R. W. Hubbard of Mitchell Valley, both of whom recently lost their wives.

Ernest Haar, one of the prominent young growers of the Idaho Creek district near Longmont, was married just before harvest to Miss Stamp, daughter of Carl Stamp, also a prominent grower at Idaho.

Gus Nelson of the Loveland district, who is farming south of the old Hamilton store, made a silo for his corn ensilage by taking woven wire four feet high and making it into a circle about
Their beets were in early in April and these Fort Collins growers have proved by their yields that an early start pays; left to right, Peter Ehrlich, Jr., with his beautiful little daughter, of Kluver, Ernest D. Nelson of Black Hollow and George Baus, who delivers at Harmony.

20 feet in diameter. Then he put rubberized paper next to the wire on the inside and filled it with silage. When the ring was filled, he put another four feet of wire on top of the first one and paper on the inside. This ring was filled and another four-foot ring put on top of the second ring and filled, which made the silo 12 feet high and holds a lot of feed.

Tom Mate of Wiggins, Fort Morgan district, started harvesting beets, and saw what a good crop he had on his fall plowed ground. He immediately started plowing the harvested bean field.

Ernest D. Nelson, Black Hollow, had a fine yield of beets on 70 acres. His beets were planted early in April, following early spring plowing and manuring. Mr. Nelson is one of the leading lamb feeders also in the Fort Collins district.

J. K. Butcher, Stegall station, Lyman, harvested one field of 9.72 acres that yielded 21.40 tons per acre.

Irving Hanson has his sheep feed lots full, having received a consign-

ment the first of the month. His crop gave promise of averaging over 20 tons per acre. His farm adjoins the Plumb dump in the Longmont factory.

Pete Sterkel, farming the W. E. McCormick place, Loveland district, has plowed under a good growth of alfalfa. This field was irrigated prior to plowing.

Otto Hienersy of Grover, Colorado, has been feeding Great Western “C” molasses on green cut Russian thistles to milk cows. He reports that they took to this feed right away and that their milk production stepped up.

Pete Ehrlich, Jr., of Kluver station, Fort Collins, is a young farmer just completing his first year’s experience farming alone for himself on one of the farms owned by Congressman Fred Cummings. The beets were planted on April 10 following manuring and early planting and given careful attention throughout the growing season. The yield on this field was expected to run 20 tons per acre, an outstanding first year’s farming experience.
Albert Mackey, grower at East La Salle, Colo., has reduced his cost of delivering beets as shown in the accompanying pictures. His trailer is an old automobile chassis on which is mounted a small bed on which he hauls about 3000 to 3500 lbs. of beets per load. This is pulled out of the field with a team and then attached to his car. He reports hauling his first 20 tons of beets at a cost of 6 gallons of gasoline.

William Kammerer of Goodrich, Fort Morgan district, has his usual 2,500 good lambs in his feed yards. Mr. Kammerer has fed lambs from the same rancher for the past 8 or 10 years.

John Brinkman, Windsor, bagged an extra fine five-point buck during last hunting season. John found his prize roaming the hills of Muddy Creek near Hot Sulphur Springs.

P. L. Conklin of Sterling is again feeding sheep on one of his farms northeast of Iliff, farmed by George Hell.

Harry Jerke, one of the Jerke Brothers at La Salle, member of the 600-Bushels Potato Growers club, and grower of high tonnage beets, is the proud father of a boy.

Harvest has slowed up on the W. C. Waugh farms after Bill's shotgun kicked him in the mouth. It was necessary to take nine stitches to close the gash in the side of Bill's face. His many friends in the Ovid district sympathize with Bill's hard luck.

Powell, Wyoming's, chapter of Future Farmers of America, made a splendid record at the national champion judging contest at Kansas City. They were given first award for community service, and in addition Sam Anderson, Mak Kawano and Wilbur Reed won fifth place judging Jersey dairy cows. Mr. C. N. Peterson, the agriculture instructor at Powell, accompanied the boys to Kansas City. Immediately upon Mr. Peterson's return he left for Billings, Montana, with his large delegation of boys from his class to show at the Junior Live Stock show. Several calves with noted brands, as well as sheep, chickens and hogs from Powell were to be shown.

Both Charles Nichols and Harry Baird near Henry, recently completed building a machine shed.

We regret to report the recent death of Mr. A. A. Smith of Mitchell, Nebraska. Mr. Smith was one of the original "old timers" in this locality, a former county commissioner and a landowner in Mitchell Valley.

The engagement of David Voake to Miss Steenma of Kersey has been announced. The wedding will take place
around Christmas. In the meantime David has been harvesting 30 acres of beets and attending to the wants of some 500 turkeys. He is a popular young grower at Plumb Switch, Longmont.

He was able to deliver a crop rating of 22 tons per acre to the Alden dump in the Eaton district. These beets were manured, phosphated and irrigated for germination.

Adam Lechman, A. C. Lechman and John Lechman of East Factory, Ovid, and Alex Lambrecht and E. F. Schroder of Julesburg, all harvested good crops of beets which were worked by their own families.

A number of trench silos are being constructed over the Loveland district and most farmers prefer this kind to the upright. R. C. Benson has filled his newly built pit silo, which contains about 250 tons of ensilage. His two uprights won't be in use this year.

Fred Gettman did a good labor job for Hylas Good, Jr., southeast of Fort Morgan. Mr. Good, harvesting what looked like a 20-ton crop of beets, planted and irrigated early.

Victor H. Akin, Gidding station, Fort Collins, director of the Mountain States Beet Grower's Marketing Association and outstanding lamb feeder and beet grower, has this year added an important sideline to his farming activities. He has controlled grasshoppers on a large acreage of land with a flock of 2,400 turkeys. Like his other farm products, Mr. Akin's turkeys are of the highest quality.

Henry H. Reichert, 22 Tons per Acre.

It wasn't a good crop year, but Henry H. Reichert was able to deliver a crop rating of 22 tons per acre to the Alden dump in the Eaton district. These beets were manured, phosphated and irrigated for germination.

John Sitzman (center) and his two sons, Robert, left, and Raymond, standing beside their Oliver “70” tractor, equipped with a new 2-row underslung power-lift beet puller. This outfit was used to harvest their 16-ton beet crop at the Alden dump in the Eaton territory.
John Hemple of La Salle started farming and raising a family this year. John delivered an excellent beet crop while the stork arrived with a boy.

Leonard Anderson, on the C. E. Van Meter place northeast of Berthoud, which was formerly owned by James Jensen, has finished his new feed lot. He is starting this feeding season with two carloads of cattle he received recently.

Jacob Schneider of Mitchell seems to be a charter member of the "Hard Luck Club." He spent considerable time in the hospital the past year and recently fire completely destroyed his automobile and damaged his garage. To top things off, one of his horses jammed him into the side of his barn and nearly sent him back to the hospital. We hope Jacob is through having mishaps for a while.

Several carloads of feeder sheep and cattle are being received daily by various growers in the Lyman territory.

John W. Waggener, Loveland grower, irrigated 20 acres of stubble field before plowing.

John Luhrs, Jr., one of Fort Morgan's outstanding young farmers, is off to a good start for '40 by fall plowing all stubble ground.

A Splendid 10-Year Record

Here is a record to be proud of—the ten-year record of Denzel Hartshorn, one of the outstanding growers of the Longmont factory district. Over this period Mr. Hartshorn has averaged 19.90 tons—almost 20 tons of sugar beets per acre—on an average acreage of 33.92 acres. The following table reflects Mr. Hartshorn's knowledge of farming and good management:

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Average, 33.92 Acres; Average Tonnage, 19.90 Tons.
Amos Mehl is using his loader to handle his beets. Amos had 84 acres and is getting ready for 150 acres in 1940. His beets go to Ovid.

Ed Ackerman of Buckeye district, Fort Collins, says, "Boy, I sure didn't pass the buck this year," as he proudly displayed a fine four-pointer.

H. C. Hale, who farms the O'Brien place east of Campion, has done a nice job plowing a 20-acre field of alfalfa.

"Believe It or Not": Earl Walker, who lives south of Mitchell, had a part of his thumb kicked off by a mule. So complete a job was done by said mule that the severed thumb stayed right in Earl's glove when he pulled it off to see how badly the hand was skinned up by the kick.

A. F. Bein, east of Berthoud, made good use of a limited amount of water. He disked the grain stubble, then took the beet cultivator and ditched the field for irrigation as one would do for row crop, then irrigated. This field could soon be plowed and worked down into a good seed bed.

Melvin Wykert, son of Mr. and Mrs. A. G. Wykert, was married recently to Miss Mabel Tormey of Ault, Colorado. Melvin's father has purchased the Pearl Hankins farm and Melvin and his bride expect to make their home on the newly-acquired farm.

Riney Weimer, son of Fred Weimer south of Fort Morgan, is plowing at least 75 acres this fall and more if it is at all possible.

Harold Schomer is recovering from a shotgun wound received the first day of pheasant season near North Platte. He had bent over to pick up a bird and was shot in the back of the legs. Harold says that it was the first time he knew he looked like a bird when he bent over.

The irrigation wells around Milliken and Twin Bridges in the Loveland district have played a big part in producing a crop this year. When the ditches became short of water, the wells were put into use and have made it possible to produce a crop.

H. F. Fuerst has shipped in 300 head of heifers to be fed on places operated by Fred H., Fred F. and John Crossant of Kuner, Colo.

Norman, son of Mr. and Mrs. S. J. Davis, Hartman station, Lyman, has enrolled for his second year of work at Nebraska university.

One group of Leggett growers, the Bixlers, certainly used their heads to good advantage when they bought the
water in Glacier lake. Even with the recent dry season, this additional water gave them an ample supply to grow a good tonnage on about 60 acres of beets in the Longmont district.

Twenty-ton beets satisfy Henry Heintz that it was smart to irrigate up.

Henry Heintz and his father, David Heintz, have a 70-acre beet contract at Gering. The first field harvested was yielding 20 tons per acre. With a good yield in prospect, Henry is satisfied that he “irrigated up” his beets last spring.

John W. and J. F. Waggener, east of Berthoud, have contracted 5,000 lambs for the season.

Henry Halweg, who works for Harry Luhrs in the Fort Morgan district believes that the time to plow for any crop is in the fall. He has plowed under the stubble on the Luhrs farm.

Many of the growers in the Hershey district have been taking advantage of the late ditch water. Ernest Voss and William Hagge have fall irrigated every acre on their farms.

Henry George and numerous others have irrigated their fall plowing.

John Greenwalt of Drake station, Fort Collins, has an exceptionally fine bunch of Wyoming Hereford steers now on feed. Mr. Greenwalt usually tops the market with his fat cattle.

Gilcrest promises to continue its high yields of beets and potatoes since ninety cars of live stock had been received by feeders in that locality up to October 20.

R. D. Brown of Los Angeles has been spending some time in Scottsbluff looking after his farms.

J. T. Wray at Johnstown irrigated his grain stubble after threshing and fall plowed. This land is working down into a very good seed bed.

Grasshoppers, worms, and a bad hail storm, did not prevent Albert Dalke, a first year beet grower, from hauling in his full 26.53 planted acres to the Proctor pile, Sterling district.
Matt Tomich of Bushnell, Nebraska, is leveling more land to place under irrigation next year. The leveler shown in the picture is capable of moving three yards of soil per load. Mr. Tomich started to irrigate some of his dry land about three years ago. He now has four good wells and is continuing to expand his irrigated farming operations.

Gerald Turner, Loveland grower, finished plowing his alfalfa field the third week in October. This field was irrigated before plowing and a good growth of alfalfa was plowed under.

Wendel Wacker fall plows for '40 and says he won't stop plowing until every acre available has been turned under. Wendel farms with his brother Henry, four miles south of Fort Morgan.

Gene Nelson, son of Mr. and Mrs. Eric Nelson of Harmony district, Fort Collins, is feeding an Aberdeen Angus calf for competition in the 4-H club division of the National Western Livestock show.

Jacob J. Hergenrader and his son Henry, of the Kirkland station east of Longmont, have a new Ford V-8 truck, with which they delivered their beets this fall.

Pete Dones of Gary, has 50 acres fall plowed in the Brush district.

Mr. and Mrs. Leo Steensma of Kuner, Colo., recently announced the engagement of their daughter Lois, to David Voake of Longmont.

Mary McCully, whose parents live just east of Lyman, was chosen champion 4-H Health Girl of Nebraska for 1939. Plans are being made to send Mary to Chicago in early December for the national 4-H health contest.

If anyone wants to know just how hard a goat can “butt,” he should make inquiry of Guy Adams of Mitchell. Nanny got Guy in the seat of the pants as he was leaning over the hay manger in his barn collecting the eggs. Guy came out second best and has been crippling around for a week.

Jack Lesser of the Mead station, Longmont district, has purchased a new Chevrolet truck.

W. A. Howard, four miles east of Loveland, carried off a whole package of honors at the Pueblo state fair the week of August 29. His two-year-old Guernsey bull, “St. Albans Foremost Vigor Valor,” took first, as well as reserve champion. Guernseys from all over the west and middle west competed. Besides the victory for his herd leader, Howard's cattle placed high in the other classes. Individual
winners: second on yearling bull; first on bull calf; first on 2-year cow; third on senior yearling cow; second on junior yearling cow; second and third on heifer calf. Group winners: second on graded herd; second on yearling herd; first on calf herd; first on junior get of sire; first and third on produce of dam. Mr. Howard has bred Guernseys for 22 years, first in the Longmont territory and for the past five years at Loveland. All his milk is used in Loveland.

Ray Reynolds of Longmont watching some of his 24-ton beets go over the Dominion Piler.

As harvest drew to a close it appeared that Ray Reynolds of Longmont would average nearly 24 tons per acre on one field of 26.6 acres. He had another field of 18.5 acres which was not expected to run quite so high. Mr. Reynolds is a consistent feeder and always on the lookout for the best methods to realize highest yield and content on his particular land.

Jack Stark took first and second place in sugar beets in the Morgan county fair! The 8-acre field from which these beets were taken made almost 24 tons to the acre with a 15.5 sugar content. Early planting with frequent irrigations seems to be the answer to this excellent crop.

Celebrating his 84th birthday, N. A. Isakson, Eaton.

N. A. Isakson believes that there’s nothing like growing a good crop of beets to keep a fellow young. Mr. Isakson recently celebrated his 84th birthday by pulling his 29th successive crop of beets, delivered to Gill station, Eaton district. Over the past 20 years Mr. Isakson’s yields have averaged 14.85 tons per acre on an average acreage of 17 acres per year.

The famous Elliott and McCarty rodeo string of broncs, including the famous Five - Minutes - to - Midnight, Brahma bulls and Texas longhorns, has arrived at the Elliott ranch, east of Mead, along the St. Vrain river bottoms, to winter, prior to their next rodeo performance.
Four advocates of timely plowing show by their yields in Morgan county that getting the crop in on time is necessary if you hope to get up to 20 tons or more per acre; left to right, Riney Weimer, Henry Halweg, Wendel Wacker and Jack Stark.

Otto Hardessen, Megeath, Nebraska, put a new Dodge truck on the job for hauling his 39 acres of beets.


Luman Beckwith returned recently from California and will make his home on the farm south of Longmont again.

Larimer county maintained its record of no defeat for the “Combination County Herd.” This “Combination Herd” is composed of individual animals from four different herds in a county. This year Mike Rothman, Loveland; W. A. Howard, Loveland; Anderson Brothers, Fort Collins, and Harry Evans, Fort Collins, combined their best animals and took first prize for Larimer county for the sixth consecutive year.

Fred Pfeif, northeast of Fort Morgan, harvested a good crop of beets. Crop was irrigated up early.

Mary Franz, daughter of Mr. and Mrs. Louis Franz of Harmony district, Fort Collins, has the outstanding distinction of having won this year seven state championships in her 4-H club work. Among these accomplishments were state championships for meal preparations and state championships for home furnishings. This makes a total of nine state championships won by Mary since she has been competing in 4-H club exhibitions, a truly wonderful record.

Vernon Runge, son of B. E. Runge, beet grower at Sidney, Nebr., went to Kansas City as one of three chosen to represent Nebraska in the Future...
There are many teams of brothers growing beets. At the left are seen the Deines brothers, Palmer, left, and George, who have been delivering beets the past 10 years at Harmony station, Fort Collins. At the right are the Graham brothers of Longmont, A. F. Graham, left, and Tom. They deliver to Mead.

Farmers of America dairy cattle judging contest at the Kansas City stock show.

Art Steyaert of Balzac, has 40 acres fall plowed in the Brush district.

The Ladies' Utility group, composed of farmers' wives of an area southwest of Longmont, has been engaged in a project of piecing quilts. As a quilt is completed, a drawing is held, and as each lady obtains her quilt, her name is dropped from the list. This will continue until each member receives a quilt.

C. A. Crayne, one of the Tabor growers in the Longmont territory, took time off at the beginning of harvest to go deer hunting.

Ray Frates and Dick Harms, Jr., of Brule, Nebraska, both obtained very good stands of new fall seeded alfalfa. Both fields were sown on summer fallow, pump irrigated prior to seeding.

A new building has been erected at the Colorado & Southern railway grounds in Berthoud to take care of this year's turkey crop. L. S. Vaughn, agent at Berthoud, deserves a good deal of credit for obtaining these shipment facilities and fostering the large increase in turkey raisers all over the Berthoud district.

John and Howard Sullivan, Windsor district, each bagged a fine buck while hunting during the deer season. John makes an annual trek to the hills during the hunting season and seldom fails to return without the coveted buck. This time they found their "stakes" high up on the Poudre.

Lawrence Henke did not fall plow last year, and now it's "Never again will I be caught like last spring." All acreage for row crops will be fall plowed for '40 on his land in the Fort Morgan district.

George Baus, Harmony station, Fort Collins, harvested what was expected to be a 20-ton crop from a 25-acre field which was fall plowed, fall manured, planted in early April and thinned early. Mr. Baus is a firm believer in crop rotation. He feeds with the landowner, Carl Hoffman, and both he and Mr. Hoffman are strong
for fall plowing, adequate fertilization and early planting of beets. Consistently high yields are the rewards for this practice.

The following beet growers recently took prizes on their beets at the Hitchcock county fair at Culbertson, Nebraska: Jake Brecht, C. J. Kern, Fred Rehn and Henry Sitzman.

Tom Brekke and Ben Kohlleppel, Stegall growers, Lyman, spent much time in gathering entries and preparing the Lyman agricultural exhibit, which won first prize at the Scotts Bluff county fair.

Edith Pumphrey, young daughter of F. D. Pumphrey, Hartman station, Lyman, was in charge of the 4-H girls' home room department at the Scottsbluff county fair. Edith also won several first prizes on her entries in home room furnishings.

H. G. Markham of Longmont recently received 20 cars of white-faced steers. They were loaded in Clarendon, Texas and took about 24 to 25 hours en route. About 9 car loads will be fed on his place two miles north of Longmont, some at Highland Lake, and the balance near Berthoud.

Wesley Johnson, Julesburg, is feeding a load of cows this fall.

C. E. Barkley, east of Fort Morgan, is an outstanding farmer in Morgan county. Clyde supervised the harvest of a 19-ton yield of beets on fall plowed land. Mr. Barkley favors fall plowing. On a 42-acre contract he harvested a high average yield this year.

J. M. Rudolph of Brush has just returned from Casper, Wyoming, where he received 40,000 lambs. About 8,000 of these will be fed in Mr. Rudolph's own yards at Brush.

Mr. and Mrs. Henry H. Schlager, on the Blackwell farm southeast of Longmont, announced the arrival of a son on August 12.

After the rain October 2, John Shank, East Factory, Ovid, was able to plow 11 acres of grain ground which he had previously manured. Being ready to plow, with the manure hauled out, shows good foresight, even if the soil for the time being is too dry.

Miss Agnes Fladung, daughter of Mrs. Agatha Fladung, accepted a teaching position at St. Mary's Seminary, Atchison, Kansas. Her sister, Miss Magdaline Fladung, is attending school at the same college.
A Fine Montana Dairy

P. Boender, Knox station, Montana, has just completed installation of an electric refrigeration unit on his farm west of Worden, Montana. This, together with a milking machine purchased this spring, makes this the best equipped dairy on the project. Mr. Boender has 25 head of milk cows which are producing around 500 pounds of butterfat. This herd has been built up over a period of 15 years through cooperation of the Huntley field station, which has been furnishing purebred sires.

Production records have been carefully kept of each generation since this program has been in effect. These records are compiled by the dairy division of the station for each dairy herd where these sires are used, which has resulted in many fine dairy cattle in this district.

Due to the quality of his product and the method of handling, Mr. Boender is able to market his milk at a premium to a distributor in Billings.

In the operation of this 160-acre farm the dairy herd has been a very profitable part of the farming program. All feed crops are used on the farm and a good supply of manure produced, which has put this farm in the high producing group.

The ninth "Achievement Day" at Brighton was a great success. There were 50% more beef cattle and 25% more dairy cattle shown than a year ago. Also large increases in poultry and rabbits.

Several of the farm boys and girls of the Fort Collins district exhibited stock and art work in the state fair at Pueblo. They were all successful in placing in their respective classes.

Fred Schmer of Drake district, Fort Collins, lost three stacks of alfalfa by fire caused by lightning.

Everett Hildenbrandt, on the George Hildenbrandt ranch at Platteville Hodgson dump, took second place on beets exhibited at Platteville Pickle Day.

Early work on the part of these Fort Morgan growers, with irrigation for germination where it was needed, contributed to high yields this year; left to right, Ed Ostwald, Fred Pfeif, J. F. Loose and C. E. Barkley.
(Importance of soundly functioning internal beet sugar industry in time of national emergency is emphasized in the following article which appeared recently in The British Sugar Beet Review.)

WAR

BRITAIN is at war. That which the Government have done their utmost to avoid has occurred. Many things must now be done, and among them is the feeding of our vast population. In this the British farmer can and will play as important a part as the Royal Navy, for the two are complementary. The more that can be done by the farmer the lesser is the burden placed upon those who are endeavoring to secure the safety of our ships.

The beet sugar industry now has an opportunity—under sad circumstances, it is true—of showing the extreme extent of its value to the nation.

Its purpose is three-fold. Firstly, it produces a large quantity of a food that could otherwise be obtained only from overseas.

Secondly, the crop yields large quantities of by-products of the utmost worth. There are the tops and leaves left on the field. Then there is the pulp, now offered by the British Sugar Corporation, Limited. And, in addition, we have the molasses for use in producing the nation's supply of yeast.

Thirdly, it is important to remember the fertility-promoting advantages of sugar beet.

Thus we have a food for direct human consumption; and by-products for cattle and sheep which indirectly increase our supplies of food as well as aid soil fertility.

It has been rightly said that in terms of human food one acre of arable land is worth three of grass, and in the case of farms where sugar beet has been included in the rotation, this figure is enhanced—especially under circumstances such as those which now prevail.

Briefly, this is the position today: We are anticipating a crop of sugar beet sufficient to produce 500,000 tons of sugar (one quarter of normal peacetime requirements and a substantially greater proportion of the probable wartime consumption); we expect 2,500,000 tons of tops which should be utilized to their utmost economic limit; and a production of pulp estimated conservatively at 250,000 tons.
# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Market and the Crop</td>
<td>179</td>
</tr>
<tr>
<td>The Proof of the Pudding—E. J. “Jack” Maynard</td>
<td>181</td>
</tr>
<tr>
<td>Colorado Stock Champs Do Well at Kansas City</td>
<td>182</td>
</tr>
<tr>
<td>Large Irrigation District Completed</td>
<td>183</td>
</tr>
<tr>
<td>Growers' Children Compete in Fat Stock Show</td>
<td>185</td>
</tr>
<tr>
<td>Loader Gives Overhead “Forward Pass”</td>
<td>186</td>
</tr>
<tr>
<td>Making the Most of Your Beet Tops—R. C. Tom</td>
<td>187</td>
</tr>
<tr>
<td>Ehlen Featured in U. S. D. A. Photographs</td>
<td>189</td>
</tr>
<tr>
<td>Weld County’s 600-Bushel Potato Club</td>
<td>190</td>
</tr>
<tr>
<td>Favors Beet Top Pasture for Breeding Ewes</td>
<td>192</td>
</tr>
<tr>
<td>Close Stand Aids 23-Ton Yield</td>
<td>193</td>
</tr>
<tr>
<td>Around the Territory</td>
<td>194</td>
</tr>
<tr>
<td>A Splendid 10-Year Record</td>
<td>198</td>
</tr>
<tr>
<td>A Fine Montana Dairy</td>
<td>206</td>
</tr>
<tr>
<td>War</td>
<td>207</td>
</tr>
</tbody>
</table>

The Great Western Sugar Co., Longmont, Colo.
Here's a unique contest, three Billings clubs backing three boys in fattening contests, with the two losing clubs to entertain the winner. Left to right: Don Shay with the Rotary calf; Gene Combs with the Kiwanis entry; and Billy Combs, who hopes to lead the Lions club to victory. Competition is heightened by the fact that both 4-H and F. F. A. honors are also at stake. Results will be announced at the Junior Fat Stock Show next fall.

JANUARY, 1940

THE GREAT WESTERN SUGAR CO.
What sugar is known everywhere for unvarying excellence?

THE GREAT WESTERN SUGAR COMPANY
Looking Toward the New Crop

Snow covers most of the beet land as this issue goes to press. January precipitation was above normal in many areas. Snow was accumulating in the mountains and farmers were hoping that the prolonged dry spell had given way to normal moisture conditions.

Forty years of commercial beet growing in Great Western territory have proved that good years are the rule and poor years the exception. Often a good crop has followed a disappointing crop. The year 1919 was dry, but the 1920 crop was good. Colorado farmers who remembered the difficulties of 1925 could not foretell that 1926 would produce the highest yield on record up to that time. The 1934 yield was the lowest in 16 years, yet the 1935 crop was above average in all Company districts. Nebraska farmers, remembering the drought, hail and other difficulties of 1936 might have easily expected another hard year in 1937, but in 1937 the Nebraska district averaged more than 15 tons per acre.

These are important facts to remember when the experience of one particular year, 1939, stands too prominently in memory.

An interesting fact about 1939 is that many farmers, despite adverse circumstances, harvested good crops. We take pleasure in printing in this issue the pictures of “Top-Tonnage” growers of every factory district. These classifications were made as follows. We first compiled a list of the ten growers with the highest yields on contracts of 10 acres or more. We then compiled a second list of growers with highest tonnage regardless of the number of acres. Such growers were included in the “Top-Tonnage” groups if their yields equalled or exceeded those of any growers having 10 or more acres.

It must be recognized that some growers who worked like Trojans got low yields in 1939, and that here and there, among the “Top-Tonnage” men, were a few farmers whose favorable yields were largely due to luck—but only a few. The majority, indeed the big majority, of the “Top-Tonnage” growers were men who got the jump on a bad season. They are good farmers, men who work for
fertility through proper rotation and use of manure—and who
GOT THEIR WORK DONE ON TIME!

Beets which were planted in good season, on early seed beds, could take advantage of spring moisture for germination. Stands were better. The beets were stronger and healthier when the hot spell came on, which wreaked such havoc with the stands of late planted beets, which, in so many cases, had to be irrigated up.

WHAT will 1940 bring? We only know that no man, in the beet business or any other business, can afford to bet on the exceptions. Bad years are exceptions. It is safer to bet on normal expectations, backed up by forty years of practical experience. In 1939 there were many growers who, by their own resourcefulness, harvested yields well above average. Many exceeded 15 tons. Some got better than 20. Some got better than 22.

The growers who beat their neighbors' yields in 1940 will be the good farmers—farmers who consider themselves engaged in a permanent business, farmers who are planning their crops right now and who will be working in the fields at the first favorable opportunity.

Impressive Conference Held on Beet Progress

THE most comprehensive conference on the march of science in sugar beet technology ever held in America took place in Denver, January 4, 5 and 6, when the American Society of Sugar Beet Technologists held its second annual meeting.

In summary: 47 organizations were represented; 31 companies; 20 sugar companies including 2 Canadian; 10 Experiment Stations including 1 Canadian; 4 beet growers' associations; 4 beet seed companies. Nineteen states, the District of Columbia, Canada and Denmark were represented. Registration numbered 232 persons and more than 300 attended some of the sessions. How great was the interest in this meeting was illustrated by the fact that three agricultural students hitch-hiked from Michigan to attend it.

Subsequent issues of Through The Leaves will publish, as it becomes available, some of the material developed in this conference. It was made clear that the sugar beet is one of the most efficient plants in the world for converting solar energy to forms available for man and beast; that the beet is constantly being improved with respect to yield, sugar content and resistance to disease; that mechanization of field work is making rapid progress; and that yields per acre, through increased knowledge of fertility, moisture requirements and farm practice, together with improved varieties of seed, may be expected to increase materially.

The possibilities of an acre of beets are not yet known. J. E. Coke, newly elected President of the Society, described one 32-acre tract of beets in the Salinas Valley of California which in 1939 averaged 45 tons per acre. Improved seed, favorable season and fertility, with good management were
J. E. Coke, President-Elect, is congratulated by N. R. McCreery on some of those 45-ton yields in California. "And we're going to show you a thing or two in this part of the country, too!" Left to right, Dr. H. E. Brewbaker, secretary-treasurer; Mr. Coke, Mr. McCreery, retiring president; and H. D. Brown, newly elected vice president.

Factors in producing this record yield, he said.

In addressing the Society, Frank A. Kemp, President and General Manager of The Great Western Sugar Company, quoted Hugh F. Melvin of the Spreckels Sugar Company:

"The yields obtained on certain fields for the season just ended indicate that there are large areas of soil having a potential producing power of forty, or more, tons of sugar beets per acre. And C. L. Piada, of the Spreckels Company, reports an average of approximately 8,000 pounds (4 tons) of sugar per acre produced in 1939 on 23,638 acres in the counties of Monterey, Santa Clara, San Benito and Santa Cruz. This is 936 pounds of sugar per acre higher than any previous record for the district and the estimated average yield of beets per acre for the district of 22.1 tons is 4.2 tons greater than ever before produced in that area."

"Such goals," Mr. Kemp said, "may seem beyond the reach of common farm practice as we know it today in the greater part of the beet-growing soils of America. Yet here in Colorado and Nebraska, in a dry year like the present, we have witnessed many growers harvesting up to 20 or more tons per acre, while their neighbors may have harvested only half that yield." A reasonable objective, he said, would be to show the man who is growing 10 or 12 tons per acre..."
how to grow 15 or more, and to place the 15-ton grower in the 20-ton class. Development of the internal seed-producing industry of the United States was described in the meetings. "It is reassuring," Mr. Kemp said, "to realize that today nobody in America is disturbed the slightest over the thought of not having an adequate supply of beet seed on hand, regardless of international complications overseas."

J. E. Coke of the Spreckels Sugar Company succeeded N. R. McCreery of The Great Western Sugar Company as President of the Society. H. D. Brown of the Canada and Dominion Sugar Company succeeded J. E. Coke as Vice President, and Dr. H. E. Brewbaker, Great Western Sugar Company, was re-elected Secretary-Treasurer.

The meetings were so conducted as to permit three sections at each session to be running simultaneously. General subjects covered were agronomy, genetics, seed-breeding, chemistry, machinery, plant diseases, pests, soils, fertilizers, and byproducts.

Demonstrations included single seed planters, mechanical blocking and thinning, harvesting machinery and beet seed threshing and cleaning equipment.

THE Emanuel Webers' beet loader aroused a great deal of local interest last fall in the Windsor district. It is so designed that the toppers following the machine pick the lifted beets out of the ground, top them and throw them against a back board from which they fall onto an endless potato-type chain to be carried up an elevator arrangement and to the truck. The hopper on the loading machine is long enough to permit eight toppers to follow topping two rows of beets each. Two or three trucks are necessary following the loader depending on the length of the haul.

Interest Shown in Beet Loader

Beet loading machine operating on farm of Carl M. Weber at Bruce, Windsor district.
Lovell Feeders’ Tour Big Success

LOVELL’S recent feeders’ tour, held during the Fall Festival, was attended by 175 beet growers and feeders. Past masters in the art of converting beet by-products and home-grown grain and hay into beef and lamb, the Lovell and Powell feeders reviewed the present feeding situation and observed the feeding set up and results obtained to date in several typical feeding operations.

Outstanding features of the present feeding season were the increased use of beet tops, which are of outstanding quality this year, and the wider use of beet molasses in the standard fattening ration. Another important feature was the universal use of steamed bone meal to secure heaviest and cheapest gains in the beet by-product rations used.

Stops were made as follows: At the Ohio Oil Co. farm, where high quality yearling steers and heifers were being fattened on grain, dried beet pulp, alfalfa, and bone meal. While these cattle showed good gains to date, the higher costs of gain in comparison with rations including beet tops, molasses and wet pulp were evident.

At Edward Doerr’s feed lot 72 steers were being fattened on a ration of wet pulp, beet tops, grain and alfalfa hay with a bone meal supplement. These cattle had put on an estimated gain of 2.3 pounds daily at a daily food cost of 14.6c per day or approximately 6½c per pound. Mr. Doerr has a compact, convenient, farm feed lot, well protected with wind breaks and deeply bedded for maximum manure production; in fact this feed lot is a worthy example of an ideal farm manufacturing plant for fertility to increase future crop yields on the farm.

At L. L. Jolley’s feed lot, 84-lb. lambs were being fattened on a standard ration of .9 lbs. mixed grain, 7 lbs. of wet pulp, 1.5 lbs. of cured beet tops, 1.5 lbs. of alfalfa hay, salt and bone meal. The estimated feed cost per hundred pounds gain, with 4% shrink, figured $6.33.

At the factory feed lots the feeders inspected Vic Neithammer’s yearling heifers, being fed a ration of 5 lbs. mixed wheat, oats, and barley, 6 lbs. alfalfa, 4 lbs. bean straw, 80 lbs. wet pulp, and 3 lbs. beet molasses. These cattle at a daily feed cost of 13.4 cents are estimated to be gaining 2½ lbs. per day. Much of the success in this feeding operation is attributed to the use of beet molasses, which will be increased to a maximum allowance of 5 lbs. per head. Last year Mr. Neithammer fed 5 lbs. of molasses to yearlings, and as high as 7 lbs. to cows with excellent results.

Tony Felhauer, extension animal husbandman from Wyoming, explained the various phases of the feed-
ing operations including gains and costs of gains from records he has compiled. A limited supply of copies of these figures are available and may be secured on request from The Great Western Sugar Company at Lovell.

Jack Maynard of Billings attended the tour and discussed feeding problems at a meeting following the tour.

He called attention to the special importance of including a phosphorous supplement in the beet by-product ration from the very first to insure getting the greatest possible fattening value from the cheap and efficient beet tops, pulp and molasses. “While these feeds are high in fattening value,” said Mr. Maynard, “we know that they lack the one essential mineral element, phosphorous, and they cannot be expected to produce maximum efficiency unless it is supplied. This is of particular importance,” he added, “during the early part of the feeding period because the beet by-products form the major portion of the fattening ration at that time.”

He reviewed feeding experiments that had demonstrated equal results by adding either 2 lbs. of cotton cake, 3 lbs. of mill feed or 1/10 lb. of steamed bone meal. “While phosphorous may be secured from any of these sources,” he said, “at present prices it is far more efficient to use the bone meal.”

He called attention to the fact that Northern Colorado and Nebraska beet growers were feeding over 7,000 tons of the improved beet molasses annually and reviewed a feeding experiment conducted by the Colorado state experiment, where this beet molasses and cane molasses were compared in a ration for fattening yearling heifers. The beet molasses used, produced greater gains, less shrink, cheaper gains, the same selling price, higher dressing per cent, and higher carcass grades on the cattle, yet sold at about 1/2 the price of cane molasses, he pointed out.

He emphasized the fact that the by-products from an average acre of sugar beets contain more net feeding value than the entire product from an average acre of corn, and cautioned beet growers to conserve their tops carefully and feed them at home.

He stated that even with a 35% loss in original feeding value in tops through weathering and handling, a 12½ ton yield of beets will produce 2½ tons of cured tops which, with only a market value of $2.00 per ton (40c per ton of beets) should contain, if fed in properly balanced ration, as much fattening value as 1,700 lbs. of barley. In this connection he recalled a feeding operation by the Bischoff Feeding Co. at Lovell during 1936-37, in which 122 yearling steers and heifers were fattened for 130 days on a ration composed of 12½ lbs. of beet tops, 2½ lbs. of molasses, 4 lbs. of alfalfa, 5 lbs. of bean hulls, and 5.5 lbs. of grain.

On this ration, which with prevailing feed prices (grain at $1.10 cwt., alfalfa at $8.00 per ton, beet tops at 40c per ton beets, molasses at $10.50 per ton, and bean hulls at $2.00 per ton) would cost only 10.7c per head daily. He said, “The cattle showed a market gain of 2 lbs. per head daily.”

He congratulated the feeders on the close study they had made of essential details in developing a standard beet by-product fattening ration and concluded by saying that he felt certain they had developed their feeding rations to the highest degree possible.
MOVIE STAR GETS 25 TONS PER ACRE

BOB BURNS, the well-known movie and radio star, is also a beet grower. Stopping off in Denver November 19, Burns said he had no illusions about Hollywood and its grandeurs.

"It's short lived," he said as he puffed away at his pipe. "You know I risked sacrificing a social position in Hollywood by deciding to buy a couple of apartment houses instead of champagne and a swimming pool."

In addition to the apartment houses he owns a 334-acre farm in San Fernando valley.

"It's a real farm operated on a business schedule by a trained farmer," Burns said. "I have sugar beets that average twenty-five tons to the acre. I got $8,000 for a sixty-acre crop. Another crop only averaged twenty tons to the acre and we got down to studying why.

"We're being scientific and practical as the times seem to demand any wise man, with a family, should be. When the time comes that the stars of the first magnitude have their glim dimmed by salary cuts, which are due, I should worry. The land- and- loud speaker will take care of me and mine."

U-BOATS CAN'T SINK 66 SUGAR SHIPS

ENGLAND is glad she has an internal beet sugar industry.

"The crop represents, roughly, some 66 ships that the Nazi U-boats cannot sink, and that the Royal Navy will not have to protect," says the British Sugar Beet Review.

"Another way of looking at it is that the figure represents about 23 pounds of white sugar per head of the population."

The magazine comments on sugar rationing during the war of 1914-18. Compulsory rationing began January 1, 1917. "At first 8 ounces per head per week was allowed. This rose to 12 ounces in 1919 but fell again to 6 ounces in 1920, in which year rationing ceased."

British farmers are now assured "that there is more seed now in stock than will be required for the 1940 crop; and there is every prospect of sufficient supplies being available for 1941, and, if necessary, for 1942."

J. L. Keefer of La Salle has recently completed a new dairy barn which will accommodate 40 cows.

Paul Hoshiko sold his 124-acre farm in the Kersey district to Francis W. Dressor. Mr. Dressor was formerly a prominent beet grower at Greeley.

Britain Recognizes Manure by Law

IN "FEEDS AND FEEDING" the author F. B. Morrison points out that "In Great Britain, where many of the farmers are long-period tenants, the manurial value of feeding stuffs is recognized by law. When a tenant vacates his leasehold he is paid for the manurial value of feeds which he has recently purchased and fed on the farm, and, under certain conditions, for the manurial value of grain produced on the farm and fed to stock."
Progress in Development of Sugar Beet Machinery

By ROY BAINER
Associated Agricultural Engineer, California Agricultural Experiment Station, Davis, California

Sugar beet machinery development is a major cooperative research project between the California and Colorado Agricultural Experiment stations and the U. S. Department of Agriculture. These investigations are supported by a substantial grant made available through the U. S. Beet Sugar Association. Some very interesting and novel methods have been developed in an attempt to solve mechanical harvesting. A brief description of an experimental variable cut topping unit and an experimental vibrator lifting device will illustrate some of these unique methods of approach.

The design of the variable cut topper is based upon data taken in California, Idaho and Utah, which shows a definite correlation between thickness of crown and the height that a beet grows above the ground. The machine is constructed with a ratio linkage connection between the finder and the knife so that a greater cut is taken on a high beet than on a low one. The height of the cut is gauged by a self-centering finder as it passes over each beet.

The topping is done by a narrow, flat vibrating knife, operated by a reaction drive mounted on one of the knife arms. This unique drive consists of an off-center slug rotated at 3000 r. p. m. (field speed 3 m. p. h.) by a flexible shaft connection to a gear box, driven from the ground wheels. The slug sets up a 100-pound force on the knife and causes it to oscillate through \( \frac{1}{2} \) inch lateral strokes 100

![Experimental Variable-Cut Sugar Beet Topper](image-url)
times per second. The flexible drive allows for quick raising and lowering of the knife without affecting its operation, and with sufficient force to operate it underground.

The unit purposely is made light to allow the finder and knife to be spring-loaded to hasten acceleration downward when passing from a high to a low beet. If gravity alone is depended upon to accelerate the mass, the machine, when traveling at 3 m. p. h., would move forward approximately 8 in. while the knife fell from a beet, 6 in. high, to the ground level. This means that many beets would be missed unless the forward speed was reduced.

Tests were run on the topping unit, during the past season, in Colorado, Utah, Idaho and California. The average of these trials showed 98.77% of the beets by weight to be acceptably topped. The top tare and topping loss amounted to 2.46% and 1.44% respectively, which is comparable with the ordinary run of hand topping. The experimental unit is illustrated in Fig. 1.

Topping beets satisfactorily while in the ground is only one step in the harvesting problem. The more difficult task is to lift topped beets from the soil and separate them from clods. A brief description of a rather novel elemental vibrating device for lifting topped beets to the soil surface will follow. At the outset it is well to point out that most of these experimental devices are quite crude in their early development. However, they illustrate possible methods of attack and demonstrate principles that in time may be utilized to lift beets and subsequently separate them from clods.

The vibrating unit consists of two horizontal rods joined to form a "V" with the open end faced in the direc-
tion of travel. The “V” is carried by four vertical supports which are driven, in a clockwise direction, by counterbalance cranks. A small engine drives the cranks at 1500 r. p. m. The throw of the cranks is \( \frac{1}{2} \) in. which gives a stroke or lift of 1 in. to the “V” each revolution.

The unit is preceded by a double pointed plow for loosening the beets. The “V” is operated just below the bulge of the beets. Its action is first that of breaking up the soil adjacent to the beet; and second, raising the beets by successive short lifts. The beet is contacted as soon as the space between the rods is equal to the diameter of the beet, which means that as the machine is pulled forward along the row each beet is contacted, regardless of size.

Several preliminary runs have been made with the elemental device shown in Fig. 2. All of the beets in the row were lifted to the surface and at the same time the clods were reduced considerably in size. Some of the tap roots were broken, due to lack of clearance and the closed end of the “V.” However, the experimental unit shows definite promise in its ability to lift beets free of clods. Further development work, making use of the principles described, is now in progress at the California Experiment station.

Adam Gertge is moving from Beetland to his own farm at Buchanan, Sterling district.

Jacob Allen, who for several years has rented the A. Anderson farm west of Billings, is moving to his own farm. Jake at present is building feed yards and plans to move his buildings to the east side of the farm.

Harold Sitzman, Park City 4-H club boy, son of Sam Sitzman, Park City, Mont., beet grower, recently won 4th prize in the 4-H club division at the International Livestock show at Chicago on his pen of 3 Southdown Lambs. He has won numerous prizes on fat calves at Great Falls and Billings shows.

Beets Vital to Reclamation Group

Importance of sugar beets to Western reclamation projects was emphasized by O. S. Warden, President, National Reclamation Association, in addressing the Eighth Annual Convention of the Association held recently in Denver.

“The production of sugar beets,” said Mr. Warden, “and their conversion into sugar, has become a matter of importance to this association, primarily because sugar beets are a leading cash crop upon Reclamation projects in 10 or 11 states of the West.

“The present sugar-quota law expires in 1940. Production has already been hindered in the United States.”
Maudru Keenly Interested in Agriculture

WHILE principally identified with the processing operations of the beet sugar industry, Joseph Maudru, general superintendent of The Great Western Sugar Company, who died in Denver January 12, was keenly alert to agricultural developments from the standpoints of both practical farm operation and scientific research. His studies in utilization of by-products, particularly in the development of improved molasses, were a contribution to livestock feeding. His research and genius, associated with many technical developments in the industry, came into particular prominence in the construction and operation since 1926 of the Johnstown factory.

Born in Ohio in 1879, and graduated from the Case School of Applied Science in 1901, Mr. Maudru worked in the beet sugar factories of Michigan and the seaboards cane refining industry. Entering Company service as a chemist in 1904, his subsequent career of 36 years of Company service was marked by progressive promotions as an executive in charge of various factories and operating districts, and since 1932 he had been general superintendent. A widely traveled man, he was familiar with beet and cane problems in America, Europe and the tropics. He was known personally to many farmers in Great Western territory from whom have come expressions of regret on his passing.

A few of the changes of tenants on farms in the Windsor district are as follows: Emanuel Brunner will farm his father's place now that his father, Fred Brunner, Sr., has moved to town. Henry Frank replaces Jacob Bush on the old Landers place. Mr. Bush has moved to his own farm in the Eaton district. Paul F. Johnson has rented the Frank Hurick place at Hurick station. Roy Sharp, the former operator, has sold his equipment and expects to work with a refrigeration and air conditioning company. Harold Asmus will farm the Smiley place vacated by Paul F. Johnson. J. J. Haas has moved to the George Nelson farm in place of Henry D. Rutz, who will farm the old Winder farm previously occupied by George Winder. Jacob Stromberger is retiring and will be replaced by his son, Carl Stromberger, on the Carl and Mae Barry farm east of Windsor. Philipp Lind is also retiring from one of the Barry farms and will be followed by Alex Stromberger. Henry Neinhuser is moving to Greeley and will rent his farm.

Leonard Frank, one of the Morey dump growers, was seriously ill with pneumonia, as we went to press, at the St. Vrain hospital, Longmont.
The Lowly Beet Top!

By JACK MAYNARD

The lowly beet top is a valuable feed
But many do not realize its value,
And others who do,
Say nothing of it.

Beet tops are priced at 25 cents to 40 cents,
But when handled and fed right
They are worth three to four times that much.
The answer is simple,
Sell less of them and feed more.

A MAN once told me he didn’t grow beets
But bought his neighbors’ tops for a song.
They were certainly kind neighbors.

The beet top has made a lot of money
For many feeders who have never grown beets
And they have been wise
To depreciate its value.

But you can’t keep a good thing down,
The truth will out,
And beet tops are getting more attention
From those who have an observing nature
And want to use black ink
Instead of red.

YOU can value a ton of alfalfa hay
Or a bushel of corn
Or a hundred pounds of oats or barley
Or wheat or rye;
But the scientist and the animal husbandman
And the nutrition shark
Have all had a hell of a time
Trying to arrive at the actual value of beet tops,
For the beet top is an elusive cuss
And changes in weight and consistency
And in feeding value
With the weather and the season
And rain or snow.

LAMBS and steers and heifers and horses
Wax hog-fat on beet tops
And even the hogs crave them.
Tops are often left lying in the windrow
Which may be O. K. when the weather is dry
And mild, and labor is scarce
And everybody busy.
But when wintry winds are howling
And the snow sifting over them
Then they look pretty nice in neat little piles
That can be hauled and fed
In a well sheltered feed lot
With a deep bed of dry straw.

Anyway, a good wind break
Will generally save at least one-fourth the feed cost
And produce about twice as much manure
To raise more beets per acre
To make more beet tops next year!

An Early Experiment in Beet Harvesting Machinery

Beet harvesting machinery has been in process of development many years. This horse-drawn machine was photographed at Greeley November 16, 1909. The man in the derby hat is identified as C. H. Allen. The editor lacks identification of the others in the picture.
Thousands to Visit Soil Fertility Train

WHAT is the “earth-power” rating of your farm?

Or, putting it another way, what is its fertility?

The farmer who harvests crops is really harvesting soil fertility, which must be restored and maintained, if the farm is to continue to produce.

Methods of building up and maintaining fertility are shown in a special demonstration train now touring the irrigated sections. The Soil Fertility Train is sponsored by the Burlington railroad, Experiment stations and the Extension Service of Colorado State College, University of Nebraska, University of Wyoming, Montana State College, the Anaconda Sales Corporation, The Great Western Sugar Company and the Holly Sugar Corporation.

By means of motion pictures, unusual displays illustrating various crop rotations, special exhibits on fertilizers and machinery, a profitable message will be brought home to every person who visits this Soil Fertility Train.

The train was on exhibition in Denver during the National Western Stock show, following which it was scheduled to visit the following points:

Sterling, Colo. January 22
Union (Messex Dump) January 23
Brush January 24
Ft. Morgan January 25
Hudson January 26
Longmont January 27
Berthoud January 29
Loveland January 30
Greeley January 31
Windsor February 1
Ft. Collins February 2
Wheatland, Wyo. February 3
Minatare, Nebr. February 5
Scottsbluff February 6
Bayard February 7
Bridgeport February 8
Mitchell February 9
Torrington, Wyo. February 10
Clearmont February 12
Sheridan February 13
Hardin, Mont. February 14
Ballantine February 15
Billings February 16
Fromberg February 17
Powell, Wyo. February 19
Lovell February 20
Basin February 21
Worland February 22
Thermopolis February 22
Bonneville February 23
Casper February 23
Douglas February 24

John Kinghorn, Jr., and Miss Hat tie DeVries, both of the Shepherd district, Montana, were recently married and are making their home on the former H. D. Soelter farm, which was bought by John Kinghorn, Sr.

E. B. Davis of the Fort Lupton factory district, attended the Farmers’ Institute at Greeley.

Tony Panker, Hartman station, Lyman, had the misfortune recently of crushing and breaking his arm when a jack he was using to lift a load of beet tops broke, pinning his arm under the axle of the wagon.

Phillip Schoneman, Minatare factory, holds the record of living on a farm for 25 years. He rents from Fred Beltner.

Fred D. Beltner, who owns and operates several of the better farms in the Bayard district, purchased 90 head of feeder cattle at the Scottsbluff auction sale December 30. He now has about 400 head on feed.

Earnest and Carl Raesener have completed two new 1,300-gallon wells on their Bijou Valley farms. This will bring another 200 acres of good land under irrigation.
STE RLING—Seated, left to right: Willard Feucht, 16.03 tons; Gottlieb Kaufman, 17.15 and 16.36; Alex Fiebig, 15.19 tons; John Ostermiller, 15.23 tons. Standing, Peter Dillie, 15.18 tons; John Wagner, 16.11 tons; George Hettlinger, 15.84 tons; Ernest B. Repp, 14.94 tons; Jake Bauer, 15.61 tons; Con Bauer, 17.05 tons. Not shown in the picture, Jake Kautz, Jr., 15.23 tons.

LOVELAND—Seated, left to right: Lyman Hull, 19.28 tons per acre; John H. Sloan, 20.37 tons; Walter G. Markham, 19.33 tons; D. R. Pulliam, 20.18 tons on one contract and 20.04 tons on the other contract; Dan Giebelhaus, 19.57 tons; (Photo not shown). Standing, John Krieger, 4r., 20.03 tons; Ellis F. Cavender, 20.99 tons; Roy A. Peterson, 21.27 tons; Henry Weber, 20.32 tons; Harold C. Hale, 23.50 tons on one contract and 20.47 tons on the other contract.

J. M. Rudolph, Brush district, topped the Chicago lamb market January 5.

Esther Kautz, daughter of Emmanuel Kautz of Iliff, was second in Fifth year clothing, 4-H clubs, at the 1939 Logan County Fair, and reserve champion.

It is next to impossible to rent a good farm in the Bayard district. Several tenant farmers are still looking for places.

Alvin Sowder, East Factory, Ovid, reports a nice profit on a load of small steers and a load of cows recently marketed at Omaha.
Top-Tonnage Growers in 1939

BILLINGS—Front row, left to right: George Staley, 20.20 tons per acre; H. E. Lackman, 19.41 tons; William Weber, 19.05 tons; Walter Schroeder, 17.97 tons; Enos J. Erb, 18.07 tons. Standing, Jacob Staley, 20.20 tons; Jacob Lackman, 19.10 tons; Harry Fink, 18.08 tons; Alfred Thompson, 18.37 tons, and Alex Laber, 20.22 tons. E. Schreuder, 19.18 tons, does not appear in the picture.

GERING—Seated, left to right: George Heintz, 19.41 tons per acre; Henry Ziegler, 17.01 tons; David Heintz, 19.41 tons; George Schlotthauer, Jr., 18.34 tons; Arthur Kurtz, 17.69 tons. Standing, Carl Brackman, 22.44 tons; August Locklair, 17.43 tons; Harvey Hawbaker, 18.11 tons; H. J. Dietrich, 19.34 tons; Henry Schneider, 19.57 tons; Alex Maisner, Jr., 17.08 tons, and Fred Brodbeck, 18.32 tons.

A. G. Lambrecht, Ione station, Fort Lupton, has moved to the Gardner farm.

Alec Bangert of Rimrock, Mont., has moved to the Ben Cardwell farm west of Billings.

J. R. Arnett, of Birdwood, has just bought an 80-acre farm in the Hershey district.

Fred Weber, Minatare factory, built a machine shed and garage, 100 feet long; also a new chicken house.
Top-Tonnage Growers in 1939

WINDSOR—Seated, left to right: Fred Schaefer, 20.32 tons per acre; Adam Ruff, Jr., 24.40 tons; A. D. King, 21.60 tons; Fred Brunner, Sr., 22.40 tons; M. J. Warner, 20.63 tons. Standing, Alex Lehr, 20.25 tons; Arthur Carlson, 20.53 tons; Sigurd Carlson, 20.70 tons; A. H. Brolein, 21.25 tons; Nels Sandstedt, 20.34 tons, and Jacob Stromberger, 20.89 tons.

WHEATLAND—Back row, left to right: E. B. May, 16.77 tons per acre; O. J. Brown, 11.25 tons; Martin Baker, 12.76 tons; Homer Cochran, 12.60 tons; M. C. Short, 11.25 tons. Front row, Mrs. Stella Logan, 11.31 tons; Louis Lauck, 12.96 tons; G. E. Graefe, 12.50 tons; G. W. Goodrich, 12.98 tons, and David Lockman, Jr., 13.19 tons.

Top-Tonnage Growers in 1939

BRIGHTON—Seated, left to right: M. Tashiro, 20.60 tons per acre; M. Murata, 19.28 tons; August H. Ehlen, 20.85 tons; Louie J. Ehlen, 19.31 tons; S. H. Brand, 18.20 tons. Standing, C. Mizunaga, 23.93 tons; Harry Rucker, 20.48 tons; Geo. Yamada, 19.19 tons; E. J. Ehlen, 21.06 tons; and G. S. Morimitsu, 19.20 tons.

LOVELL—Front row, left to right: C. W. Mobley, 18.58 tons per acre; Ed Stiles, 18.16 tons; C. C. Burnham, 17.63 tons; C. E. Frederick, 17.59 tons. Middle row: L. L. Jolley, 17.47 tons; A. B. Wrigley, 17.96 tons; Herbert Beech, 17.38 tons; John D. Fink, 18.42 tons. Top row: George Dunmire and F. C. Sproul (Montgomery & Sproul) 17.53 tons; Farnham McArthur, 18.35 tons, and the Wiley Brothers, Clyde, Harry, Robert, 19.58 tons and 17.39 tons.
Top-Tonnage Growers in 1939

**BRUSH**—Seated, left to right: George C. Pabst, 18.16 tons per acre; D. E. Wind, 18.01 tons; Ernest Hansen, 18.87 tons; Harry Bolinger, 17.74 tons; Geo. G. Walter, 19.40 tons. Standing: Henry Linker, Jr., 20.43 tons; S. E. Thulin, 18.07 tons; C. A. Krueger, 18.39 tons; Henry Bening, Jr., 18.93 tons, and Steffen Christensen, 18.07 tons.

**OVID**—Top row, left to right: Charles Huffman, 17.50 tons per acre; Arthur F. Lowes, 17.62 tons; Pete Nein, 17.18 tons; Rene J. Martin, 17.27 tons; Joe Paloucek, 17.26 tons. Lower row, Henry Toillion, 17.36 tons; A. C. Leehman, 18.59 tons; F. L. Smith, Ovid, 16.79 tons; Jacob Meier, 17.53 tons; L. R. Morley, 17.14 tons, and Dick Harms, Jr., 18.39 tons.
Top-Tonnage Growers in 1939

EATON—Seated, left to right: Jake Uhrich, Jr., 21.06 tons; Charlie Eckhardt, 21.75 tons; J. S. Dalton, 21.01 tons; Asa Mason, 21.02 tons; Henry H. Reichert, 20.50 tons. Standing, Reuben B. Lebsack, 21.02 tons; Harold O. Swanson, 22.52 tons; Eben Bostrom, 21.29 tons; Philip Miller, 20.73 tons; John Drobnitch, 22.62 tons; and J. A. Wagner, 21.26 tons.

FORT LUPTON—Seated, left to right: Ralph T. Bangert, 21.73 tons per acre; O. N. Putnam, 18.65 tons; Fay Elliott, 19.75 tons; H. C. Vollmer, 18.46 tons. Standing, George L. Ewing, 18.96 tons; Walter B. Williams, 19.00 tons; Sam Kushio, 18.12 tons; Kuni Masunaga, 19.91 tons; F. B. Neff, 21.15 tons; Sam Kato, 18.59 tons; and Floyd D. Elmore, 19.82 tons.
Top-Tonnage Growers in 1939

FORT MORGAN—Inset left, George R. Clark, 19.40 tons. Standing, left to right: Jacob Frick, 18.82 tons; Leonard E. Reag, 23.77 tons; Fred B. Johnston, 18.33 tons; Edward Ostwald, 19.77 tons. Seated, David Weimer, 18.67 tons; J. F. Loose, 18.65 tons; C. E. Barkley, 19.19 tons; Victor Asmus, 18.80 tons. Inset, right, R. P. Graeb, 18.70 tons.

BAYARD—Seated, left to right: Phillip Nagel, 15.72 tons per acre; Henry Scheenemann, 17.65 tons; Fred Berquist, 17.82 tons; Sam Michal, 16.08 tons. Standing, Andrew Pepler, 16.02 tons; Carl Schwindt, 15.82 tons; David Schneider, 16.64 tons, and Tom Megas, 16.94 tons.

C. E. Frederick of Deaver, Wyoming, recently purchased the E. E. Elliott homestead, which joins his own. This was one of the original homesteads on the Deaver flat and makes a good-sized holding for Mr. Frederick.

Karsh Brothers have brought in a fine new well that throws 1,600 gallons per minute. This is the second well brought in on this farm and brings under irrigation about 200 acres of new land south of Fort Morgan.
**Top-Tonnage Growers in 1939**

**GREELEY—**Seated, left to right: R. J. Grams, 19.21 tons; Leonard Smits, 18.92 tons; John Rein, 19.06 tons; Mayme H. Johnson, 21.59 tons; Jacob Reinick, 18.74 tons, and Leo Smits, partner of Leonard Smits. Standing, Manuel Kindsfater, 20.61 tons; Philip Schlagel, 19.67 tons; Earl Cogburn, 19.35 tons; C. W. Linden, 19.08 tons; George F. Johnson, 19.09 tons; George Sylvester, son of Mrs. Mayme H. Johnson; Albert E. Nesom, 18.97 tons; Dan Steinmetz, 19.09 tons; Frank Miller, 18.74 tons; George Roth, 19.33 tons, and John J. Borgens, 18.79 tons.

**LYMAN—**Seated, left to right: Joe Long, 16.42 tons per acre; Bert Stone, 16.19 tons; Paul Blood, 16.62 tons; John Sokol, 16.27 tons. Standing, Rhea Heuerman, 16.43 tons; J. L. Lippincott, 16.09 tons; C. M. Kellums, 17.45 tons, and Rudolph Rehder, 16.18 tons. (Absent when the Lyman picture was taken were Frank Tanaka, 16.87 tons per acre, and Jack Reichert, 16.73 tons.)

Winbourn Enemoto, Ione station, Fort Lupton, has moved to the Zaiss Investment Company farm.

W. H. Byrd, well known farmer of the Billings Bench, is home from the hospital after recovering from a long siege of pneumonia.

Keith Carter, factory station, Fort Lupton, enjoyed a well-earned vacation during the holidays with relatives in Grand Junction.

David Kaufman, Minatare factory, did some remodeling this fall and now has an attractive modern farm home.
Top-Tonnage Growers in 1939

FORT COLLINS—Seated, left to right: Byron F. Shader-B. T. Brown, 17.99 tons per acre; Emory C. Woods, 18.45 tons; John Greenwalt, Jr., 22.61 tons; Carl F. Mauser, 18.37 tons. Standing, William Smith, 18.26 tons; Carl Christensen, 18.59 tons; Godfred Becker, Jr., 18.82 tons; Peter Ehrlich, Sr., 19.17 tons; Peter Ehrlich, Jr., 18.25 tons, and John Schroeder, 19.37 tons.

MINATARE—Seated, left to right: Ed Brackman, 20.95 tons per acre; M. G. Wilson, 17.69 tons; Harry Krumenacher, 16.01 tons; Charles Hinman, 18.16 tons. Standing, Fred Weber, 17.20 tons; Fred Pester, 16.26 tons; David Reizenstein, 16.45 tons; Leo Schumacher, 16.25 tons, and David Quindt, 11.71 tons. (Harry Crabill, unable to be in the photograph, averaged 17.81 tons per acre.)

Genial Conrad Meyer, ably assisted by his sons, is building a beautiful home on his 320-acre farm at Ashton, southwest of Greeley. The new house will be the outstanding farmstead in this progressive community. Beside the home place, which the Meyer family has owned and operated for many years, they have purchased an improved 80 acres 3 miles away, close to Greeley.

Recently many carloads of potatoes have been sorted and shipped by the farmers in the Lyman district.
Top-Tonnage Growers in 1939

MITCHELL—Seated, left to right: Raymond Johnson, 16.14 tons per acre; H. P. Gompert, 16.70 tons; E. W. Trout, 18.43 tons; J. D. Bright, 17.69 tons. Standing, Henry Stuckert, 16.59 tons per acre; E. H. Janssen, 16.37 tons; Alex Becker, 17.03 tons; and H. K. Nakada, 16.33 tons. (Absent when the Mitchell picture was taken were W. H. Bright, 17.46 tons per acre, and T. Arutani, 16.19 tons.)

SCOTTSBLUFF—Seated, left to right: J. P. Hollingsworth, 17.79 tons per acre; Harry Lehr, 18.89 tons; George Dorsch, 17.31 tons; Charles B. Barbour, 17.48 tons; S. H. Kuntz, 19.27 tons. Standing, Neal A. Barbour, 18.68 tons; J. C. Steele, 17.82 tons; Ted Gable, 17.82 tons; D. E. Selver, 18.89 tons; and Jim Harris, 17.70 tons.

Henry Gantz, Minatare factory, bought a splendid 80-acre farm. Mr. Gantz worked beets for a number of years, then rented a farm for several years and now is making his home on the farm he bought.

The Kiowa community mourns the passing of Wayne Diemer, landowner, grower and early settler in the Lyman district. Mr. Diemer had been in poor health during the past two years.
Several of the members of the Brush F.F.A. entered their livestock in the National Western Stock show in Denver. The following boys had the following entries: Tommy Winger, 2 Hereford steers; George Hart, 1 Angus steer; Bob Oldemeyer, 3 fat lambs; Arnold Christensen, 3 barrows; Robert Greenwald, 2 barrows; and Calvin Lucht, 1 barrow.

Miss Marjorie Detlefsen, daughter of Mr. and Mrs. Art Detlefsen of Gering, was married at 10 o'clock, December 29, 1939, to Charles Horky, son of Mr. and Mrs. V. C. Horky of Lynch, Nebraska, that day being the 20th anniversary of her parent's wedding. Immediately after the ceremony a wedding dinner was served at the home of the bride's parents. After a wedding trip the couple will be at home in Gering after January 15.

C. H. Martin and F. W. Northway, who have been farming just north of the factory at Lovell, have moved to the Lucy Wallace farm near Garland.

Fusa Tomita at Iliff is again 4-H clothing champion of the Logan County Fair. This is her fifth successive year to attain this honor. She also took third place at the Colorado State Fair. Her brother, Teddy, was selected as gardening champion of 4-H clubs at the Logan County Fair.

Death of Lynn Edmonds of Loveland marked the passing of a pioneer closely associated with the beet industry since its start, the first of the century. His farm was located opposite the entrance to the Loveland factory and was his home for many years, until his retirement two years ago.

Hugo Gremel visited with his parents, Mr. and Mrs. Gus Gremel, Brighton district, during the holidays. He is now a beet grower for the Saginaw, Mich., plant.

Cornelius Michel, who has lived on the cemetery road west of Billings, is moving to the A. Anderson farm south of Yegen.

Morris Goldstein, Ady station, Fort Lupton, returned from a pleasant vacation in Rochester, New York, his former home.

A very pretty wedding ceremony was solemnized at the Lutheran church in Bayard Sunday, December 24, when Miss Leah Schwindt became the bride of Joyce Anderson. The parents of the bride and groom are well-known farmers in the Bayard and Bridgeport territories.

Howard Allison of Siding Two station, Mont., who with his wife and son, was in a serious car collision during beet harvest, reports that his family has made a good recovery from their injuries.

Mrs. August Locklair, of the Haig community, was admitted to the hospital in Scottsbluff December 30, for an appendix operation. She is recovering satisfactorily.

William Fink, son of John D. Fink of Lovell, was awarded a special .22 target rifle as first prize for his outstanding beet project record in the Lovell F.F.A. contest.
Jake Kemble of the Billings Bench makes the following statement:

"Before I could make manure, I had to build a windbreak corral. It pays for me to feed my cattle in the corral.

"I had 25 head of cattle from October 1st to the middle of March. I also bedded 10 head of horses. I fed all of my tops in the corral and saved a lot of feed by doing so. I hauled straw from 100 acres of grain for bedding. In the spring I manured 35 acres of beet ground at 15 spreader loads to the acre.

"I also made manure during the summer by putting my cattle in the corral at night and also running water into the corral.

"I plowed under 19 acres of annual sweet clover along with the manure on my beet land."

Carl Miller, Sterling grower, is completing a fine farm home on his place at Hall, which he intends to farm himself in 1940.

Mr. and Mrs. John Giesick, who live in the Hesper neighborhood, Mont., are spending the winter in California, while their son Elmer is taking care of the farm.

T. M. McKee of Loveland has just completed an irrigation well project on his farm 3 miles east of Loveland on the Greeley-Loveland highway. A series of 3 wells, connected to a single pumping unit, has been installed. If advisable, two more wells can be added. A good flow of water resulted from the 3 wells. It would seem that after such prolonged drought as has been experienced this past season, any well producing now would be adequate at any time.

George Marquette, of Hershey, is out and about again after being confined since the first of November. He was very seriously burned during beet harvest when a tractor backfired and exploded.

On January 4, W. L. Baldridge of Severance succumbed to an attack of influenza complicated by pneumonia. Mr. Baldridge had been a prominent figure in his community for a long time and his many friends sorely grieve his passing. Mr. Baldridge was 84 years old.

It was moving day for J. G. Buehler the day after New Year. The Buehler family has been farming what is called the old Eberhardt place, south of Berthoud, for the last 29 years. Four trucks were hired by Mr. Buehler to move the accumulated belongings of all these years. Fortunately the moving is only one-half mile distance to Fred Mundt's place on the Denver highway. Mr. Roy Welty, the new owner of the Eberhardt farm, is going to build a new house and intends to make this his future home.

Joseph Thompson, grower at Jessum station, Longmont, took advantage of the warm fall weather by doing considerable levelling on his farm.

The question concerning the reason for the building of a modern home by J. H. Kaman, grower at Hartman station, Lyman, was recently answered when J. H. married Miss Rachel McElroy, teacher at South Morrill school east of Lyman. Congratulations, Mr. and Mrs. Kaman.
Minatare factory weigher, Rowena Helmick, started the leap year by getting married and now calls herself Mrs. Kenneth Conklin. We all wish you success and happiness, Rowena.

Emil and Solomon Deines, sons of George Deines west of Billings, recently joined the ranks of married men. Emil and Solomon farm with their father.

J. A. Stockwell and Sam Cross of Bayard have purchased from the First Trust company of Lincoln a 160-acre farm located near the Craft dump.

To H. C. Hale, farming 2 different places, goes the honor of having both farms in the high tonnage class for the Loveland factory district in 1939. The home place under established rotation system raised 20.25 acres of beets, 23.50 tons per acre with an 18.8 per cent sugar, while the O'Brien place raised 21.30 acres—20.47 tons per acre and a 17.8 per cent sugar.

Henry Klaus and son Arthur and daughter Mrs. Pauline Snook, have left for Los Angeles where Mrs. Snook will board the S. S. Surline for her home in Honolulu. Mr. Snook is a radio operator for the Pan-American Airways. Mr. Klaus is a farmer in the Haig territory.

Justin Jones has a nice new home on the farm which will be occupied by his mother in the Sterling district.

The slogan of Jacob Betz at File dump south of Berthoud is “Anticipate Your Problems.” Mr. Betz used his surplus water last fall to irrigate all land laid out for his 1940 beet crop. Manured, disked and plowed, this ground is well worked down and ready for a crop that J. Betz claims will make him more money than any other crop he can raise.

Harry Rucker, Brighton, is getting along nicely with his first attempt at feeding out a bunch of calves.

Raymond Pyle of Proctor, (center), with another load of beets. The Pyle family harvested better than 150 acres of beets in the Sterling district.
L. C. LeBlanc and son, Robert, of Crook, Colorado, received many prizes at the Logan County Seed show. Robert received his fourth championship on 4-H corn, all varieties. Other prizes that they won were: third and fourth on ten ears irrigated Crawford yellow dent; third and fourth on ten ears irrigated Colorado white dent; first and second on ten ears yellow Jolly Time pop corn; first on Hidden ear sample; second on peck of Ceres spring wheat; fourth on ten heads of milo; first and second on ten heads of Higari grain sorghum.

Conrad Schaefer attended the National Western Stock show in Denver and exhibited three steer calves, ten months old, weighing over 800 pounds. They were products of his own herd.

Martin Botsch of Shepherd, Mont., has moved from the farm northwest of Shepherd to the farm formerly occupied by Ernest Hackman, also of Shepherd.

Leo Knago, son of Mildred Knago of Keenesburg, who is attending School of Mines at Golden, was home for the holidays.

The William Heffelbower coupe and the Axel Sarin truck loaded with beets collided at the Jillson corner about the end of beet harvest. Fortunately no injuries were sustained by the occupants but both coupe and truck were quite badly damaged. Mr. Heffelbower has delivered beets to the Puritan dump for many years, while Axel has been hauling his to Idaho since Firestone was abandoned with the installation of the piler at Harney.

K. Shino, Sterling district, has moved to his farm at Beta from his old home at Merino, where he has lived and farmed for 25 years.

Mrs. Albert Richardson has returned to her home east of Lyman from the Scottsbluff hospital, where she recently underwent an appendix operation.

Levi Keithly, long-time prominent beet grower of the Hesper district, Mont., was seriously injured in a fall from his barn. Mr. Keithly suffered a broken hip and arm. He is in the Deaconess hospital in Billings.

R.E.A. now have men setting poles for an electric line which will serve Prospect Valley. This will be completed around March 1st, and will give farmers power for pumping irrigation water, in addition to the lights for their homes.

Spalding Newton has moved to and will farm the Cora Lee Green farm this coming year. It is located in the Rinn community, the beets going to the Idaho dump, Longmont district.

The George Meier family will move into their new home which was recently completed about the middle of January. The new house is located on the farm three miles southeast of Lyman that Mr. Meier bought last summer.

Several wells are going in in the Minatare district. M. G. Wilson has just completed a fine irrigation well which, under test run, produced 1,200 gallons per minute. Leo Schumacher has had some test wells put down on his farm and plans to put in an irrigating pump in the near future. Bill Baxter has also put in an irrigation well on his farm. Otto Juergens is putting down a second well on his farm. Otto Haggerd, who is with the Western Land Rolling Co. of Hastings, is in charge of putting these wells in and he is very optimistic about the future of land irrigation in this country.
Bill Ross, Stillwater county agent, and Keith Sime of Yellowstone county joined the Great Western Sugar Company on a Feeders’ Tour December 22. The tour started at R. E. Lindgren’s feed yard seven miles west of Columbus and stops were made at the Nelson Bros., Lewin Hergett, Jake Benner, John Mohr, Slagton & Lierow, Dave Sitzman, John Hergett, K. Weschenfelder, Ed Coombs, Bill Fox, E. W. Coombs, Shay Bros., and L. A. Nutting farms. Talks were given at noon by P. H. McMaster and Jack Maynard of the Sugar Company and R. T. Clark of the Montana experiment station. Farms visited in the afternoon included those of Emmett Vaughn, Paul Ronan and the Mackey Sheep Company.

Peter Gundunas, who has been farming near Bayard for the past several years, held a general farm sale a few days ago, and he and his family have moved to California.

The Colorado-Portland Cement farm west of Loveland, vacated by Peter Sauer, is rented to Peter Sanders coming from Niwot, southwest of Longmont.

On Christmas day Miss Jane Herring became the bride of Kenneth Hills of the Mintle community. Mr. Hills was one of the few old bachelors of that vicinity of Nebraska.

Alfred A. Doerr of Lovell has recently completed his new farm site which includes new corrals, a fine barn, and a beautiful brick dwelling.

C. E. Melvin at Beta, Sterling district, raised the best beet crop in 1939 that he has grown in spite of grasshoppers, drouth and beetles.

Mr. Elmer Johns of Longmont has purchased the E. G. Blake place north of Johnstown. Mr. Johns will operate the place himself and Conrad Hopp, Sr., who has farmed the place for about 18 years, has rented a farm close to Mead.

Chris Karrell bought a farm two miles west of the Spurling beet dump. The farm was owned by John Fox, Sr., of Laurel.

Ernest Voss, of Hershey, is the proud father of a new daughter born January 5, 1940.

Jim Kikker, son of James Kikker, Brighton, has now finished his course in aviation in Florida and has been transferred to the Hawaiian islands.

Art Holten and family, who are farming 6 miles northwest of Bayard, have returned after spending the holidays in California.

Everett Chesterman, who has been farming on the Anita Bench, Mont., for the past decade on a 40-acre farm, has branched out. He has purchased the F. A. Stanton ranch at Bull Mountain station. This ranch consists of 400 acres, 100 acres of the best irrigated land on the Huntley project. Mr. Chesterman became acquainted with farming by working six years on the F. A. Stanton ranch, which he has now purchased.

The Earl Anderson and Lloyd Milner families and C. A. Jillson, all prominent beet growers in the Idaho Creek territory, Longmont, spent the Christmas holidays in California.

A. A. Smith, well known in livestock and land affairs of Eastern Colorado, recently topped the Omaha market with two carloads of cows. These cows were some of the older foundation stock of the Haley-Smith Company purebred Hereford herds. Alfalfa hay, wet pulp and a small amount of ground corn were used in the fattening ration. As much as 150 pounds of wet pulp per day were consumed by these aged cows.
Mrs. Gust Anderson of Lyman is improving rapidly from a serious operation which she had over a month ago.

Joe Davicco, Riley station, Bayard, returned to his home from St. Joseph hospital at Alliance, where he was confined for medical treatment.

E. H. Sappington at Milliken has purchased 3 farms in the last 3 years that join the home place. Mr. Sappington is due a lot of credit for the way he has improved these places. It is a light sandy soil that blows easily and in the past years high sand drifts had piled up at fence lines and ditches. This land has been leveled down with tractors and trucks and is now producing good crops. The seepy land was drained and the dry land was leveled off so it could be irrigated. He also installed an irrigation well that delivers 2½ second-feet of water.

Bobby Wilder, Bernard Skoglund and Calvin Eiker are among the 4-H club members at Big Springs who exhibited their stock at the Denver Stock Show. W. G. Wilder is the local club leader.

Dave Keller's son, David, had his club calf in first class condition for the stock show and he hopes to make a good showing. They live in the Brighton district.

Jacob Kujatt, of Newton station, Mont., has purchased the ranch from B. Kesselheim of Billings, which he has farmed for the past nine years. Before becoming a beet raiser in this territory, Mr. Kujatt was a dryland farmer, but he has mastered the art of irrigated farming and now owns this 160-acre ranch. He has been able to purchase this ranch because he has made a thorough study of farming and beet raising.

W. E. Fraizer of the Vollmar station was re-elected President of the Fort Lupton local beet growers' organization.

Pheasant season caused plenty of trouble on many farms. Jens Frederiksen, Longmont district, was struck in the face and head by shot. T. E. Whisman also of Longmont reported a steer shot in the leg.

C. H. Packer, near Lyman, has helped make it possible to complete a skating rink in Lyman by giving water from Packer Lake, which is on his place. The Lyman Lions club is sponsoring the ice skating rink.

Harley, son of Mr. and Mrs. E. Holliday, Bayard district, has returned to Golden, Colorado, where he is a student in the Colorado School of Mines.

Stephen Breidenbach, who has farmed in the Sterling district for twenty seasons, is making preparations to move into his newly finished home located on the farm he recently acquired near Iliff.

Fred Huwa, who is farming the Sugar Company farm at Johnstown, harvested 60.68 acres of beets in 1939 with an average yield of 17.72 tons per acre. Fifteen acres of this crop were irrigated up on May 25.

Death has taken a number of well-known people in the Longmont district, among them being Charles G. Anderson, 77; Swan J. Swanson, 79; Mrs. Alice Olson, 63; and Carol Bashor, 33.

Lyman Hull at Buda dump was one of the ten high tonnage growers in 1939, and it looks as if he intends to stay up in that class. He has his beet land for 1940 crop manured and fall plowed; also there are more than 200 head of cattle on feed on the place.
John L. Stief of the Keown district, Mont., has purchased 60 head of good grade cows and a purebred Hereford bull, with which he will build a fine farm flock of stock cattle. Mr. Stief operates one of the fine farms of the Lenehan Estate and goes into the "livestock on the farm" with the full cooperation of the landowners.

Keith Neville, of North Platte, broke 80 acres more sod this fall near Birwood, to be combined with his present farm. Mr. Neville is to be complimented on the improvements made on the farm which he bought in the spring in 1939.

Numerous farmers in the Lyman factory district have taken advantage of the warm weather during the past late fall season by plowing hundreds of acres of ground.

Tony, son of Mr. and Mrs. S. P. Reano, of Guthrie station spent the holidays with his parents, returning to Long Beach, Calif., the first of the year.

George Hoffman again carried honors in the corn and grain division at the Logan County Seed Show held at Sterling on January 3 and 4. Many unusual educational features highlighted this year's show.

J. H. Schmidt, who is farming the George W. Lee place at Buda dump, is now a landowner. He has purchased the August Johnson place one-half mile south and 1 mile east of Buda dump. The place will be farmed by Jake Schmidt, Jr., a son of J. H. Schmidt.

F. A. Wilson, manager of the Longmont factory, has 8 registered and grade Guernseys that ranked first among small herds in the state last month with an average production of 41.5 pounds of butterfat when milked twice daily.

Many of Montana's Carbon county lamb feeders are about ready to go to market with the tops from their feeding pens. Some of these are F. A. Carmony and W. L. Lindsay. Anthony Oberbauer and Bud Hunter have recently sent their tops out.

Adam Fenning has been feeding beet tops successfully to some aged ewes on his place. By grinding the beet tops the ewes have been leaving little if any waste. Adam is farming on Harve Lippincott's place east of Lyman.

Jake Vogel, Sr., recently sold his 160-acre farm, which is one mile north of the Bayard factory, to Alex Stricker of the Atkins district. Mr. Stricker, altho not living on the farm at present, has already moved his feeder cattle to this farm in order to secure fertilizer for the coming year.

Herzog Brothers of Buchanan, Sterling district, have decided that a foursome can do a better job of farming than a twosome. Henry is to marry Flora Reitz in the near future. Miss Reitz is the daughter of Henry Reitz, Iliff grower. Jake is to marry Miss Bernice Smith of Padroni later in the winter.

Gene Winchell, son of Mr. and Mrs. Earl Winchell of Janise district, Lyman, Nebraska, was married to Myrtle Ledford of Morrill.

Joe Gartner of Ford station, Sterling, intends to keep up the fertility on his high yielding farm. Joe is feeding 1,800 good-quality Texas lambs this winter.

C. H. Hilsabeck of the Henry district in the Lyman territory is completing the construction of a new set of farm buildings on one of his farms south of Henry. Henry Martin will be the new tenant.
Mr. and Mrs. I. Blackburn, who have been leasing a farm in the Perrin district, Bayard, for a number of years, recently purchased a 120 farm from the Northwestern Life Insurance Company. The Blackburns have been extremely busy this winter repairing, remodeling and building on the farm to which they are about to move. They should be congratulated on securing this good farm which we hope they will be able to enjoy for many years to come.

We learn with regret of the serious illness of John Minch of Loveland. Mr. Minch came to Colorado from Russia many years ago and became one of the picturesque figures in the infant beet growing industry at Loveland. He retired from active beet raising several years ago, leaving the operation of his farm south of Loveland to his eldest son, Rudolph.

John Spurgeon, son of Mr. and Mrs. Joe Spurgeon of the Everett territory, recently married Stella Priest, daughter of Mr. and Mrs. Vincent Priest of Scottsbluff. They will make their home on a farm near Scottsbluff.

A significant gathering of farmers and officials was held January 2, six miles east of Loveland, when the ceremony initiating the new government Rural Electrification project was held. Extending from Pierce, Colorado, on the north through the Longmont territory to the south, the extensive enterprise will be fed with power from Seminole dam and distributed via Greeley. It will supply domestic power to the farmers and rural settlements in this extensive territory, later on the Grand Lake-Big Thompson project will supply the power.

Martin Schaffer and Gene Doversberger, Brighton, just returned from California where they witnessed the Parade of Roses and also the Rose Bowl game.

The new Japanese church at Fort Lupton is almost completed. This church was built entirely by the men of the church during their spare time from the farm work.

Carl Tinsman, from Severance, spent the holiday season visiting his brothers in the East. Carl first went to Detroit, where one brother is located. From Detroit he traveled to New York City, where he was the guest of his brother, Dr. Rex Tinsman. Carl tells some tall tales about the big city and appears to have seen the works.

William Felker has moved from the A. & J. Hakanson farm at Jessum to the Middleton farm at Kirkland. Joe Steinbach will farm the Hakanson place.

John H. Eckhardt of Eaton has purchased from Perini Brothers the farm at La Salle formerly owned by Lord Ogilvy of The Denver Post.

Heber Robb and his son, Kenneth, of Cowley, Wyoming, put 800 lambs into their feedlot last fall for the first time. Expert feeders in this district claim Mr. Robb has some of the finest lamb feeding pens anywhere to be found.
Frank Eckhardt and Allen Winslow of Peckham have sold their interest in the Wiswall ranch southeast of Greeley to Lawrence F. Lutz of Denver. This ranch includes 6,600 acres of deeded land and 2,000 acres of leased state land. Mr. Eckhardt and Mr. Winslow will continue to operate their farms at Peckham.

Oscar Nelson has purchased the John C. Moquist farm in the Kuner district. Mr. Nelson was formerly a tenant on the John T. Warren farm at Kuner.

Wayne Peer, son of H. R. Peer, beet grower at Auburn, was a member of the 4-H club team which tied for first place in stock judging at the National Western in Denver.

Lowell Carlson, son of Mr. and Mrs. G. R. Carlson, living one mile north of Greeley, won third place on the 1940 Weld County Champion 4-H club stock judging team at the 1940 Denver Stock show.

Miss Eleanor Anderson of Greeley and Roy Kohler of Kersey were married January 14. Mr. Kohler has been a prominent beet grower in the Kersey district. The young couple will be located on a farm near Ault.

Jim Wright, high school student and son of T. S. Wright, west of Greeley, won highest individual grading in the local seed judging contest held at Greeley in the Court House on January 13. Ray Clark, another high school student, and son of Oscar Clark of Gilcrest, won fifth place in the same contest.

Mrs. J. A. Johnson of Gilcrest, Colorado is showing the men how to grow beets. From her contract of 14.6 acres she harvested a crop that averaged 21.59 tons of beets per acre. The beets were planted before April 15th, on land that was fall manured and fall plowed. Starting June 20, she irrigated the field lightly twelve times up to harvest time.

G. Kaufman, of Powell beet dump in the Sterling district, is feeding 985 lambs this year, and always has fertilizer for his fall plowed fields. Mr. Kaufman is high tonnage man this year in the Sterling district.

Turkey pickers and their finished product at the farm of Roland W. Stull, Crook, are shown here. Mr. and Mrs. Stull employed nearly forty persons who picked over 3000 turkeys, all of which were raised by the Stulls or neighboring farmers. They used the semi-scald method and were able to pick about 600 birds a day.
Table of Contents

Looking Toward the New Crop .......................... 3
Impressive Conference Held on Beet Progress .... 4
Interest Shown in Beet Loader ......................... 6
Lovell Feeders' Tour Big Success .................... 7
Movie Star Gets 25 Tons Per Acre .................... 9
U-Boats Can't Sink 66 Sugar Ships .................. 9
Progress in Development of Sugar Beet Machinery—
Roy Bainer ........................................... 10
Maudru Keenly Interested in Agriculture ............ 13
The Lowly Beet Top!—Jack Maynard ................. 14
Thousands to Visit Soil Fertility Train ............... 16
Top-Tonnage Growers in 1939 ......................... 17
Around the Territory .................................. 27

The Great Western Sugar Co., Longmont, Colo.
THROUGH THE LEAVES
March, 1940
THE GREAT WESTERN SUGAR COMPANY
How little the consumer in the United States pays for sugar, compared with sugar prices in other countries is shown below, reprinted from a recent study by the Department of Commerce. The complete study covered 38 countries. In these 38 countries, comparing retail prices May 1, 1939, with May 1, 1938, prices were higher in 17 countries, the same in 13, and lower in eight countries, including the United States.

RETAIL PRICE OF REFINED SUGAR AND PER CAPITA CONSUMPTION IN SELECTED COUNTRIES

PER CAPITA CONSUMPTION* IN POUNDS, RAW VALUE

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RETAIL PRICE IN U.S. CENTS REFINED SUGAR, MAY 1, 1939

*Includes only white sugar

Consumption estimates by Loomis.
Prepared in the Foodstuffs Division, Bureau of Foreign and Domestic Commerce 1939

00-36-322
Increased Beet Acreage Indicated

Present indications point to increased beet acreage for 1940 in territory served by The Great Western Sugar Company. Contract negotiations were concluded in Colorado February 28, in Nebraska, February 29, at Wheatland, Wyo., March 4, at Billings, March 13, and at Lovell, Wyo., March 16.

Soil moisture is good to excellent in all factory districts and seed bed preparation has been proceeding rapidly where the land could be worked. Precipitation generally has been above normal in 1940 to date, with snow continuing to accumulate in the mountains.

Extended drought during 1939 retarded water storage in reservoirs. Reservoir supplies, however, are now building up. March reservoir supplies are of interest to growers. In the past, however, March reservoir conditions have not proved a very dependable index of prospective beet yields. In 1939, for example, the early storage situation was the best in years, but the 1939 crop yield was low. Conversely, good yields have sometimes followed what appeared to be uncertain early water supplies.

The Company has recently conducted a study of precipitation in calendar years and March reservoir conditions as related to yields of beets. On the basis of information compiled to date, there has been no significant correlation between reservoir supplies March 1 and subsequent beet yields. Precipitation, however, is very important. The curve for beet yields, in the calendar years studied, closely parallels the curve for precipitation, particularly precipitation in April, May and June.

If 1940 repeats the experience on which these studies have been made, actual water in storage at this time is of less significance than precipitation since January 1, plus precipitation in the period ahead. The fact that the year has got off to a wet start is reassuring.
TIMELY VERSUS LATE PLANTING—1939

<table>
<thead>
<tr>
<th>Location</th>
<th>Timely Planting</th>
<th>Late Planting</th>
<th>Difference in Favor of Timely Planting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yield Stand</td>
<td>Yield Stand</td>
<td></td>
</tr>
<tr>
<td>Eaton</td>
<td>14.26 68.6</td>
<td>11.88 55.4</td>
<td>2.38</td>
</tr>
<tr>
<td>Greeley</td>
<td>13.39 64.4</td>
<td>9.49 53.0</td>
<td>3.90</td>
</tr>
<tr>
<td>Windsor</td>
<td>14.96 66.1</td>
<td>11.13 54.6</td>
<td>3.83</td>
</tr>
<tr>
<td>Fort Collins</td>
<td>11.02 64.7</td>
<td>9.37 56.5</td>
<td>1.65</td>
</tr>
<tr>
<td>Loveland</td>
<td>14.69 77.3</td>
<td>9.67 62.6</td>
<td>5.02</td>
</tr>
<tr>
<td>Longmont</td>
<td>11.21 63.4</td>
<td>9.59 59.1</td>
<td>1.62</td>
</tr>
<tr>
<td>Brighton</td>
<td>11.52 73.2</td>
<td>8.27 54.7</td>
<td>3.25</td>
</tr>
<tr>
<td>Fort Lupton</td>
<td>12.93 67.4</td>
<td>9.29 55.5</td>
<td>3.64</td>
</tr>
<tr>
<td>Northern Colo.</td>
<td>12.91 67.0</td>
<td>9.62 56.4</td>
<td>3.29</td>
</tr>
<tr>
<td>Ovid</td>
<td>12.08 68.7</td>
<td>10.47 62.5</td>
<td>1.61</td>
</tr>
<tr>
<td>Sterling</td>
<td>10.90 63.6</td>
<td>8.96 58.8</td>
<td>1.94</td>
</tr>
<tr>
<td>Brush</td>
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<tr>
<td>Fort Morgan</td>
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<td>9.89 52.2</td>
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</tr>
<tr>
<td>Eastern Colo.</td>
<td>11.90 65.7</td>
<td>10.30 57.2</td>
<td>1.60</td>
</tr>
<tr>
<td>Colorado Dist.</td>
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<td>9.83 56.6</td>
<td>2.74</td>
</tr>
<tr>
<td>Scottsbluff</td>
<td>12.45 58.7</td>
<td>10.40 52.7</td>
<td>2.05</td>
</tr>
<tr>
<td>Gering</td>
<td>13.07 60.0</td>
<td>10.60 54.9</td>
<td>2.47</td>
</tr>
<tr>
<td>Bayard</td>
<td>9.76 44.6</td>
<td>8.65 50.6</td>
<td>1.11</td>
</tr>
<tr>
<td>Minatare</td>
<td>14.03 55.6</td>
<td>10.17 51.2</td>
<td>3.86</td>
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<tr>
<td>Mitchell</td>
<td>12.02 50.5</td>
<td>11.30 48.7</td>
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<td>Lyman</td>
<td>10.90 55.6</td>
<td>9.65 50.3</td>
<td>1.25</td>
</tr>
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<td>Wheatland</td>
<td>6.02 46.5</td>
<td>6.73 52.8</td>
<td>——.71</td>
</tr>
<tr>
<td>Nebraska Dist.</td>
<td>11.77 54.6</td>
<td>9.92 51.7</td>
<td>1.85</td>
</tr>
<tr>
<td>Billings</td>
<td>11.46 69.9</td>
<td>8.76 63.1</td>
<td>2.70</td>
</tr>
<tr>
<td>Lovell</td>
<td>12.57 72.2</td>
<td>9.41 63.4</td>
<td>3.16</td>
</tr>
<tr>
<td>Montana Dist.</td>
<td>11.70 70.4</td>
<td>9.18 63.3</td>
<td>2.52</td>
</tr>
<tr>
<td>Total G. W.</td>
<td>11.92 67.8</td>
<td>9.68 55.9</td>
<td>2.24</td>
</tr>
</tbody>
</table>
Early plowing enables timely planting. By the time February had turned the corner, Leonard Schmer, son of Fred Schmer, Fort Collins, was busy with his plow.

Timely Planting Averaged 2\(\frac{1}{4}\) Tons Better Than Late for G-W Territory in 1939

Stands Also Averaged 12 More Beets Per 100 Feet of Row

The 1939 beet crop proved again that getting an early start is a very important factor in securing maximum yields per acre. Timely planting favored increases ranging from less than one ton to more than 5 tons per acre, as compared with late planting, in the various factory districts, as shown by the table on the opposite page.

The average for the Colorado district in favor of timely planting was 2.74 tons over late planting. In Nebraska the increase was 1.85 tons, and in the Montana district 2.52 tons.

Taking Company territory as a whole, it appears that the early birds with their seed drills averaged about 2\(\frac{1}{4}\) more tons per acre than those who got a late start.

It will be remembered that in 1939 abundant spring moisture was followed abruptly by extreme and prolonged drouth. Seed which was planted early was germinated by soil moisture. Late planted seed lay in dry ground as hot weather was coming on and irrigation for germination was necessary over wide areas.

What is timely planting? What is late planting?

In making a study of growers’ records for 1939, timely planting
in northern Colorado was considered planting completed by April 15. Late planting was planting started after April 20.

Timely planting in eastern Colorado, Nebraska and Wheatland was considered to be planting completed by April 20. Late planting was considered to be planting started after April 25.

In the Montana district timely planting was considered to be planting completed by April 30, and late planting was planting started after May 8.

It will also be noted that timely planting produced better stands than late planting. The average for all Company districts as a whole showed approximately 12 more beets per 100 feet of row on timely planted fields than where the crop got a late start.

Sugar content was about the same on timely and late beets. However, production of sugar per acre was higher on the earlier planted fields because of the higher yield.

Suggestions on Seed Beds and Planting

SUCCESSFUL beet farmers prepare their seed beds as early as possible. They recognize, however, the dangers of trying to work the soil too wet and that taking time to do the job right actually saves time in the long run.

Spring plowed land should be worked down to a compact, garden-like seed bed immediately after plowing. The land should be harrowed not later than one-half day after plowing in order to break up the clods and mulch the surface before the soil has dried to form clods. Where a farmer has plowed in the morning, it is advisable to harrow at noon; likewise harrow again in the evening after finishing plowing.

The next operation is to pack the soil. Some farmers use the disc set straight. The Campbell packer is preferred by many. The packing operation should then be followed with a land level or float. Harrow after floating to prevent the surface from blowing.

Fall plowed land should be harrowed as soon as the surface is dry enough to work, in order to pulverize the clods and leave a surface mulch. The field should then be floated, and harrowed again after floating. If rain has fallen between the time the land has been prepared and planting, the land should be harrowed again crosswise of the direction of the rows immediately before planting.

The direction of the rows is important in realizing the most efficient use of water and preventing washing. The rows should run in a direction to permit sufficient fall of water and penetration without washing.
The planting operation itself is very important. The farmer should not wait until he is ready to plant before seeing that his drill is in good shape. Checking up on the drill is a good "rainy day" job. All parts of the machine should be working properly, checked for width of row and marker accuracy. The tubes should be cleaned out and the machine oiled.

Tests during recent years have shown disc-type drills to result in higher germination stands than shoe-type drills. Under certain conditions the shoe drill leaves the seed in a groove, without close contact with the soil to facilitate germination.

Research is continuing toward single seed planting. By this method seeds are planted in a continuous row and spaced mechanically. It may develop that single-seed planting in the future may eliminate thinning, the entire hand job being done with a long handled hoe blocking mostly to single plants. Single-seed planting, while making headway, is still in the experimental stage in this territory. Excellent seed bed conditions and optimum soil moisture are essential to good results.

Not less than 20 pounds of seed per acre is recommended for usual planting methods, although this may be reduced some where single seed planters are used. Many farmers plant more than 20 pounds per acre.

Seed should not be planted more than 1¼ inches deep. It may be planted shallower if the seed is to be irrigated for germination.

Ditchers should always be used on the drill, usually between
every other row. They provide furrows for irrigating up if necessary. They give some protection against blowing. They make crust breaking easier. And they permit more accurate blind cultivation.

"And it means extra tons to make a good seed bed, and extra tons mean extra profit,"—which is shown in the early thinned and unirrigated stand of A. D. King, growing on an exceptionally fine seed bed, in the Windsor district. The picture at topping time last fall shows Mr. King and his crew harvesting a 22-ton yield of beets as resulting from the fine start the plants received from this very fine seed bed.
When scientific research discovers new facts, the next step is to put these facts into practical use. Typical of the interest shown by farmers in the fruits of research is this picture showing part of the big crowd attending Sugar Beet Field day at Fort Collins, September 8, 1939, when scientists of Colorado Experiment Station and Colorado State College explained recent developments in beet culture.

What Good Is Research?

By DR. H. E. BREWBAKER

When Gladstone was shown the electromagnetic motor, he asked, "What good is it?" to which Faraday replied, "What good is a baby?"

And so might George F. Shull or the late Edward Munay East have asked "what good is it?" when they first glimpsed an inbred or self-fertilized line of corn. But those same inbred lines of corn looked so very feeble and stunted, and which under the most favorable conditions could produce nothing but nubbins, when crossed together produced an amazing hybrid, far surpassing either of the weak parents and the original variety. In those same frail inbreds, East and Shull as early as 1906 saw the possibilities of improved corn, which would be resistant to smut and other diseases, which would stand up when storms might blow other varieties down, and which would yield far in excess of the ordinary commercial varieties. How well they predicted can only be judged by the tremendous popularity of corn hybrids in the Corn Belt of the
Figure 1. Steps in the production of Minhybrid 403, a corn hybrid produced by the Minnesota experiment station. This hybrid was found adapted and is recommended by the Colorado experiment station for northern Colorado. Note the very weak inbreds which are the parents of this excellent hybrid. All corn hybrids result from the crossing of much weakened inbreds, each of which possesses certain desirable characters supplementing what the others lack, so that the resulting hybrid becomes far superior to the ordinary commercial varieties. (Photo by courtesy of Minn. Agr. Exp. Station).
United States at the present time. Adapted hybrids are just be-

These and other scientists, who are working for improvement

Plant and animal breeders all over the United States assisted

JUST a few other examples might be mentioned of what these

In 1934 the rust resistant variety Ceres was being grown on

The story of Thatcher wheat reveals the master planning and

Dr. H. K. Hayes sought to combine the rust resistance of

another hybrid, Kainred x Marquis, resulted in the variety Thatcher. This variety has not only proved to be outstanding for the spring wheat area in the central states, but is now recommended for Colorado and other areas.

Such is the problem of the plant breeder—always seeking superior germ plasm wherever it may be found, then building toward a commercially valuable variety.

NOT to be outdone by the wheat breeders, the American sugar beet scientists are rapidly adding some brilliant pages to the modern record of progress by plant scientists. It was less than a decade ago when the Curly top disease was rapidly closing sugar beet factories on the western slope of the Rockies and as far west as California. Dr. Eubanks Carsner and his staff of U. S. D. A. scientists discovered resistant plants growing under heavy attacks of Curly top. These resistant individuals were saved and out of their work the U. S. No. 1 variety came into broad use in 1934, and the industry began to take a new lease on life. Other improved Curly
top resistant varieties followed as U. S. 33, U. S. 34, U. S. 12, U. S.
15, U. S. 22, U. S. 23, and the growers no longer fear the attacks of
this dreaded disease. Factories closed as a result of this disease
have opened and new ones are being built.

Again, east of the Rockies the leaf spot disease may result in
as much as 20 to 40% losses in yield. The plant breeders have
tackled this problem. U. S. 200x215 has already gone out to the
growers as a partially resistant variety and others with greater
resistance are in the course of development by U. S. D. A. and sugar
company plant breeders.

Along with these improvements in varieties other scientists
were developing and making safe a tremendous domestic sugar beet
seed producing industry, principally in the Southwest—New Mexico,
Arizona, Utah and California. For the first time in history the
existence of war in Europe, from which came nearly all of the
sugar beet seed used in America, has resulted in comparatively
little concern in the American sugar beet industry—thanks to the
scientists responsible for the domestic seed development in the
Southwest. Sugar beet growers are now provided with high grade
seed of improved adapted varieties, thus completing the entire
domestication of this industry.

Can we place a reliable estimate on the value of these contribu­
tions in improved varieties of crops for the farmer? Dr. G. H.
Coons of the Sugar Plant Office, U. S. D. A., attempted two years
ago to make such an estimate of benefits derived for the field and
vegetable crops through breeding disease resistant varieties. The
total estimated annual saving to farmers reached the staggering
figure of $66,000,000. The contribution to national wealth would
far exceed that amount. Each year this contribution becomes
larger as plant breeders and other scientists replace the older
varieties with new ones resistant to disease and otherwise improved.

What good is research?

What good is a baby?

“The Greatest Patriot”

WILLIAM PENN and George Washington warned American farm-
ers against the erosion of their fields. Thomas Jefferson declared:
“Fields are no sooner cleared than washed.” Patrick Henry may be best
remembered for saying “Give me liberty or give me death!” but in the
reconstruction period after the American revolution he also told Ameri­
can farmers that “since the achievement of our independence, he is the
greatest patriot who stops the most gullies.”
TO CLEAN HIS PHOSPHATE DRILL THE GROWER DROVE IT INTO THE WHEAT FIELD. BELOW IS ANOTHER VIEW SHOWING THE BEETS ALSO.

A Phosphate Demonstration at Cowley

By Ralph J. Stahle

PHOSPHORUS, though occurring in relatively small quantities both in the plant and in the soil, is probably next after nitrogen the most limiting element in plant production.

The amounts in which phosphorus, potash and nitrogen are taken from the soil by different crops is given in the following table:

<table>
<thead>
<tr>
<th>Crop</th>
<th>Phosphorus (P\textsubscript{2}O\textsubscript{5})</th>
<th>Potash (K\textsubscript{2}O)</th>
<th>Nitrogen (NH\textsubscript{3})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beets-10 ton</td>
<td>16</td>
<td>64</td>
<td>62</td>
</tr>
<tr>
<td>Alfalfa-4 tons</td>
<td>43</td>
<td>178</td>
<td>228</td>
</tr>
<tr>
<td>Sweet Clover-4 tons</td>
<td>53</td>
<td>101</td>
<td>223</td>
</tr>
<tr>
<td>Potatoes-150 bushels</td>
<td>11</td>
<td>48</td>
<td>37</td>
</tr>
<tr>
<td>Barley-50 bushels</td>
<td>11</td>
<td>36</td>
<td>71</td>
</tr>
<tr>
<td>Oats-50 bushels</td>
<td>21</td>
<td>51</td>
<td>50</td>
</tr>
<tr>
<td>Corn-50 bushels</td>
<td>21</td>
<td>42</td>
<td>92</td>
</tr>
</tbody>
</table>

It is too often thought that by plowing up a sweet clover or alfalfa field and putting it into beets that no fertilization is necessary; that the legume has built up the soil, and a good crop of beets should be expected.

From the above table it can easily be seen that alfalfa and sweet clover take from the soil about 3 times as much phosphorus as do beets. In fact they are the heaviest users of phosphorus we have on our farms, and it is a recommended practice in the Lovell factory area that alfalfa and sweet clover ground always be phosphated before beets are planted.

During the past year, throughout the Lovell district, there were many examples of what an application of phosphate does when applied on land plowed out of alfalfa or sweet clover. The results are quite outstanding and show a profit in the use of the fertilizer.

The photographs accompanying this article were taken July 7, 1939, on the farm of H. C. Cozzens at Cowley, Wyoming. After applying phosphate to the beet ground the grower drove on into the field that was to go into wheat in order to clean his drill. You notice clearly how phosphate stimulated the growth of wheat as well as the beets. Both the beets and wheat followed alfalfa which had been in five years.

Elburn Kenison, the tenant, took random samples of phosphated and non-phosphated beets from different sections of the field. The growth on the phosphated beets is evident from the picture.
How Much Water Does It Take?

By T. STEVENS

COOPERATING with the Company fieldman, Ronald Jolley, Wyoming university sophomore, has obtained some interesting data on measuring the water used to irrigate beets. Ronald is the son of L. L. Jolley, one of Lovell's Master Growers for 1939. A 1939 field was selected in which the rows were all the same length and had the same amount of fall, with the same type of soil throughout. Each plot was made up of 80 rows. The water was run on Plots I and III, each time they were irrigated, for 2½ hours, which was the length of time required for the water to run well through the length of the row before being shut off.

The water was run on Plots II and IV for four hours each time, and on Plot V the water was allowed to run for 8 hours each irrigation.

A Parshall measuring flume was used and a careful record was kept of the flow of water and the length of time each set was run. No attempt was made to account for the run-off from each set, so the resulting records show only the amount of water applied to each plot and not the amounts absorbed into the ground.

On the opposite page is the account of the water used to irrigate each plot and the resulting yields:

You will note in the data opposite that Plots I and III which received the least amount of water produced the highest yields, also that there was a considerable reduction in yield on Plot V, which was so excessively irrigated.

Where water is plentiful there is a natural tendency to use it in excess to the detriment of the soil as well as to the crop which is being grown.

Elmer Glantz of Pine Bluffs, Wyoming, last fall siloed a mixture of one-half beet tops and one-half cane. This silage came out of the silo in fine shape and made an excellent feed.

Val Sanger deserves a lot of credit for the leveling and reclamation job he has done on an 80-acre farm he recently purchased north of Ovid. Mr. Sanger spent many days this winter with his tractor and home-made level scraping off "the humps" and filling "the hollows." As a result, about 15 acres of ground that couldn't be watered before are now under irrigation and several large permanent ditches have been removed. A house is now being built on the farm. Val has been a consistently high tonnage tenant farmer for a number of years. We predict that, by following his practices as a good tenant, viz, the use of manure and crop rotation, Val will increase the yields of all crops on this farm.
<table>
<thead>
<tr>
<th>Plot</th>
<th>Acre Inches Per Acre</th>
<th>Acre Inches Per Acre</th>
<th>Acre Inches Per Acre</th>
<th>Acre Inches Per Acre</th>
<th>Acre Inches Per Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>II</td>
<td>7.998</td>
<td>12.797</td>
<td>7.998</td>
<td>12.797</td>
<td>25.593</td>
</tr>
<tr>
<td>IV</td>
<td>5.698</td>
<td>9.118</td>
<td>5.698</td>
<td>9.118</td>
<td>18.235</td>
</tr>
<tr>
<td>V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>27.332</td>
</tr>
</tbody>
</table>

- **First Irrigation—July 28th**
- **Second Irrigation—August 15th**
- **Third Irrigation—September 1st**
- **Fourth Irrigation—September 14th**

<table>
<thead>
<tr>
<th>Inches of Water per Acre Used</th>
<th>27.332</th>
<th>43.733</th>
<th>27.332</th>
<th>43.733</th>
<th>87.464</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precipitation (May-Sept. Incl.)</td>
<td>5.78</td>
<td>5.78</td>
<td>5.78</td>
<td>5.78</td>
<td>5.78</td>
</tr>
<tr>
<td>Total Used Per Acre</td>
<td>33.112</td>
<td>49.513</td>
<td>33.112</td>
<td>49.513</td>
<td>93.144</td>
</tr>
</tbody>
</table>

- **Average Acre Inches of Water Used Per Irrigation**: 6.833
- **Yields Per Acre (Tons)**: 16.51
- **Tons of Beets Harvested Per Acre Inch of Water Used**: .50 .29 .48 .30 .14
- **Length of Run**: 400' 400' 400' 400' 400'
A WIND approaching tornado proportions caused considerable damage in the Windsor territory June 10, 1939. A. S. Schneider of Gates station thought his 12-acre field of beets had "gone with the wind." He irrigated promptly, as shown above, and gave good care to his beets—harvesting a 13-ton yield. Beets are a hardy crop. They often come back after punishment that would cause bigger losses to other crops.
Colorado Pushed Fall Work for 1940 Crop

THERE'S less spring work for a farmer if he did as much as he could the previous fall.

Last fall the fields were dry. Plowing was difficult in many places. On some farms it seemed practically impossible. But where plowing could not be done, some farmers did considerable discing and manuring.

Before the year 1939 was over Colorado District farmers had done advance work on 92,500 acres—an excellent record. They had plowed 56,007 acres. They had disced and manured an additional 13,383 acres. They also had disced another 23,110 acres.

Here is the record:

<table>
<thead>
<tr>
<th>Factory</th>
<th>Acres Fall Plowed</th>
<th>Acres Manured and Disced</th>
<th>Acres Disced Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eaton</td>
<td>4056</td>
<td>70</td>
<td>1380</td>
</tr>
<tr>
<td>Greeley</td>
<td>2374</td>
<td>1207</td>
<td>295</td>
</tr>
<tr>
<td>Windsor</td>
<td>1727</td>
<td>763</td>
<td>2133</td>
</tr>
<tr>
<td>Fort Collins</td>
<td>925</td>
<td>2139</td>
<td>3298</td>
</tr>
<tr>
<td>Loveland</td>
<td>5738</td>
<td>1210</td>
<td>3856</td>
</tr>
<tr>
<td>Longmont</td>
<td>9090</td>
<td>1230</td>
<td>1160</td>
</tr>
<tr>
<td>Brighton</td>
<td>8436</td>
<td>910</td>
<td>1207</td>
</tr>
<tr>
<td>Fort Lupton</td>
<td>6496</td>
<td>1225</td>
<td>2831</td>
</tr>
<tr>
<td>Ovid</td>
<td>5006</td>
<td>1424</td>
<td>2601</td>
</tr>
<tr>
<td>Sterling</td>
<td>7829</td>
<td>233</td>
<td>639</td>
</tr>
<tr>
<td>Brush</td>
<td>4374</td>
<td>2795</td>
<td>1308</td>
</tr>
<tr>
<td>Fort Morgan</td>
<td>4956</td>
<td>177</td>
<td>2402</td>
</tr>
<tr>
<td>Colorado District</td>
<td>56007</td>
<td>13383</td>
<td>23110</td>
</tr>
</tbody>
</table>

That fall preparation pays, when the work is done correctly, was illustrated by the 1939 crop, which repeated the story of many previous years.

Records for 1939 show that 1,012 Colorado contracts were grown on land entirely fall plowed. The average yield per acre on this fall plowed land was 12.32 tons per acre. The average yield in the Colorado District was 11.14 tons per acre.

In other words fall plowing showed an average increased yield of 1.18 tons per acre.

Floyd Anderson of Drake station, Fort Collins, believes in rotation of crops. His 1939 corn field yielded 76 bushels to the acre. This field was out of alfalfa into grain, then beets, grain, corn and will be in beets this year. His 1939 beet yield was 15.36 tons per acre, and he is heading for a higher yield this year.

Paul Kurtz, near the Thomas dump, Scottsbluff factory district, says he is going to plant beets about two weeks earlier than in 1939 as he believes it is better to risk a frost than poor germination, resulting from later planting. Last year he had to irrigate up his crop.
**FEED VALUE OF BEET TOPS**

<table>
<thead>
<tr>
<th>Topping Time</th>
<th>Field Cured</th>
<th>Field Cured on Dry Basis</th>
<th>Alfalfa (2nd and 3rd Cutting)</th>
<th>Small Grains No. 1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Beet Tops Are An Important Factor**
- **Aiding Local Livestock Farmers**
- **To Compete With Corn Belt Feeders!**

**YIELD - POUNDS PER ACRE - FROM IMPROVED LAND**

<table>
<thead>
<tr>
<th>Field Cured Tops</th>
<th>Alfalfa</th>
<th>Small Grains</th>
</tr>
</thead>
<tbody>
<tr>
<td>From a 15 Ton Beet Crop</td>
<td>From a 17½ Ton Beet Crop</td>
<td>From a 20 Ton Beet Crop</td>
</tr>
<tr>
<td>Shelled Corn</td>
<td>Barley</td>
<td>Oats</td>
</tr>
<tr>
<td>45 Bu. 40% D.S.</td>
<td>60 Bu. 40% D.S.</td>
<td>60 Bu. 40% D.S.</td>
</tr>
</tbody>
</table>

**SUGAR BEETS!**
"Thirty dollars and a love of work" gave R. M. Haythorn his start in Weld county 55 years ago. He has developed the land himself and trained others so that they, too, could become land owners in their own right.

Pioneer Land: The Other Side of the Story
By LYMAN ANDREWS

What Four Owners Have Done With 56 Farms in Weld County

YOU HEAR a lot nowadays about pioneer land that has run down and become unproductive. Weld county can tell you a story of pioneer land that is being consistently developed and improved. Take the actual records of four large land-owners with headquarters at Eaton. Each of these land-owners has nine or more farms, together they own 56. These farms have been developed from pioneer farms. Their story is not only a story of making irrigated land pay. It is also a story of training men to learn how to make the land pay. Study the records of these farms and you find noteworthy instances of tenants who have become outstanding land-owners in their own right.

Take sugar beets as an index of what these farms are doing. Over the past five years, 1935-1939, the farms of these four land-owners have averaged 1,610 acres of sugar beets a year. The 5-year average yield per acre has been 16.97 tons. The Eaton district itself has had the highest average yield of any Colorado district—14.40 tons during this period. This group of 56 farms exceeded the Eaton average by 2.57 tons per acre. There was fractional difference between Eaton and Gering, Nebraska, for the highest Company yield during this period, Gering having the edge with 14.43 tons per acre. So it appears that this 4-owner group of farms exceeded the highest factory average in Company territory by 2.54 tons per acre over the past five years—a remarkable record for a group of farms representing more than 1,600 acres of beets a year.
Governor Benjamin J. Eaton knew the significance of water. He knew the meaning of water to land. Today 25 fine farms are owned by the Eaton family and careful records are kept of actual water used on every crop on every farm. This photograph shows John Granat and an Eaton pumping plant which produces 3,750 gallons per minute—one of the largest wells in Colorado.

These farms are characterized first of all by good management. You will find outstanding owner-tenant cooperation and planning. Good farm practice becomes a by-product of this kind of cooperation. These farms are characterized also by excellent improvements, continuing rotation systems, live stock feeding and adequate water supply.

The largest number of farms owned by this group of landowners belongs to the Eaton Investment Company, managed at present by Rex Eaton, grandson of former Governor Benjamin J. Eaton. President of this company is Bruce G. Eaton, under whose early management this large holding of 25 farms was built up. The Eaton farms, located in the Windsor, Eaton and Greeley factory districts, have for the past five years produced an average of 823.4 acres of beets averaging 16.65 tons per acre.

In 1939, three of the tenants on the Eaton farms were in the "high-ten growers" for the Windsor factory district. Each year finds representatives of these farms among the high growers in this area. The Eaton farms, in general, have probably the best supply of irrigation water in this section. There are three reservoirs located on the farms. The ditch water rights are supplemented with irrigation wells where it is necessary. One of the finest and largest pumping plants in Weld county is located on the home ranch. This well furnishes water at the rate of 3,750 gallons per minute.

Detailed records are kept of the amount of water used by the Eaton farms on each crop throughout the growing season. This practice of strict accounting is also followed for all farm crops and feeding operations. Several thousand head of lambs and several hundred cattle are fed annually. This utilizes the large quan-
Is it possible to average 19 tons of beets per acre on 330 acres for five years? Ask the Farrs and their tenants: they know how to do it. Here is Bill Farr discussing a manure-rotation problem with Herman (left) and Manuel Kindsfater. Landlord-tenant cooperation is one of the secrets of making a go of farming.

W. FARR, the owner of twelve farms, has in recent years turned over the management of these lands to his son, W. D. Farr. They have produced for the past five years an average of 330.4 acres of beets that averaged 19.00 tons per acre for the full period. In 1939, three of their tenants, two at Eaton and one at Greeley, were among the ten high-yielding growers. In the past, these Farr farms have produced yields which were the highest in the Colorado district. The high yields on these farms are paralleled by the fine improvements. Last year individual farms produced bean yields of 53 bushels per acre and potatoes yielded almost 600 bushels per acre.

The Farrs have provided irrigation wells to supplement their ditch rights of water. Considerable time and money have been spent leveling the land and installing the most effective checks and ditch systems to utilize irrigation water most efficiently. H. W. Farr is known as one of the largest and most successful feeders in Northern Colorado.

M. HAYTHORN is one of the few early pioneers now actively engaged in managing his farms. At the present time, he owns and operates 9 farms that have in the past 5 years produced an average of 240.9 acres of beets, with an average of 16.33 tons per acre.

Mr. Haythorn came to Weld county in 1885 with, to use his words, “Thirty dollars and a love of work.” He is rightfully proud of the fact that all of these farms today are more fertile and produce higher-yielding crops than they did during the years imme-
The feed-lot fattens the farm! Jim Brown sees to it that his crops have plenty of soil food to eat on the ten Brown farms. Restoring fertility to the soil is a cardinal principle in this system of farm management.

diately following the breaking from virgin sod.

One of his tenants is Alfred Arvidson, who, through the help and guidance of Mr. Haythorn, now owns six farms. For the past five years these six farms have produced an average yield of 17.67 tons of beets per acre on 123.2 acres. It is a splendid achievement, as a man advances in years, to be able to look back upon a record of developing not only farms but men. Also it is a noteworthy fact that the Haythorn farms are free of mortgages and encumbrances.

W. J. Brown, known as "Jim", is a son of the late W. W. Brown. The elder Brown was employed in the early days by Governor Eaton, and from that start built up the present holdings of ten farms that produced an average of 215 acres of beets that yielded 15.83 tons per acre average, during the past five years. Under Jim's management, these well-improved, fertile lands are being handled in a most modern and up-to-date manner. Mr. Brown is one of the large feeders of live stock in this area.

The following gives the sugar beet record of these groups of farms for the period 1935-1939:

<table>
<thead>
<tr>
<th></th>
<th>5-Year Totals</th>
<th>Annual Averages</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acres</td>
<td>Tons</td>
</tr>
<tr>
<td>H. W. Farr</td>
<td>1651.9</td>
<td>31373</td>
</tr>
<tr>
<td>Eaton Investment Company</td>
<td>4117.2</td>
<td>68591</td>
</tr>
<tr>
<td>R. M. Haythorn</td>
<td>1204.9</td>
<td>19874</td>
</tr>
<tr>
<td>W. J. Brown</td>
<td>1075.5</td>
<td>17020</td>
</tr>
<tr>
<td><strong>Totals for 4 Owners</strong></td>
<td><strong>8049.5</strong></td>
<td><strong>136658</strong></td>
</tr>
</tbody>
</table>

Average for Eaton factory district, 14.40 tons per acre.
$25 Grand Prize To Dale Fuehrer

A CASH prize of $25 has been awarded to Dale Fuehrer, 15-year-old sophomore in the Mitchell, Nebraska, high school for his essay on soil fertility reprinted herewith. The circumstances under which this honor was awarded will be of interest to our readers.

That the younger generation is vitally interested in soil fertility was illustrated by the fact that hundreds of essays were written by boys and girls in connection with the tour of the Soil Fertility Train sponsored by the Burlington and Colorado & Southern Railroads, State Colleges and Extension Services of Colorado, Nebraska, Wyoming and Montana, The Great Western Sugar Company, The Holly Sugar Corporation and the Anaconda Sales Company. Local prizes for winning essays in this territory were awarded by the Anaconda Sales Company.

The winning essays showed a remarkable knowledge of soil fertility. They were turned over to the Editor of Through The Leaves, who would have liked to print all of them, but this was impractical because of space limitations. It was then suggested that a grand prize of $25 be awarded to the writer of the best essay, the essay to be printed in Through The Leaves. The offer was made by the Anaconda Sales Company, through R. A. Jones, Sales Manager.

Professor Alvin Kezer, head of the Agronomy Department, Colorado State College, kindly consented to select what he considered the best of the winning essays. Professor Kezer was the only judge. He selected Dale Fuehrer's paper.

We were unable to secure Dale's photograph in time for this issue, but will print it later. Dale is the son of Mr. and Mrs. Lester Fuehrer of Mitchell. His father is manager of the North Central Gas Company of Mitchell. Though not a farm boy, Dale is vitally interested in agriculture. His grandfather, G. W. Dakin, was a salesman for the Western Union Chemical Company of Cleveland. Dale remembers hearing his grandfather talk by the hour about soil chemistry and, though only 15, Dale has done advanced reading in the field of soil science, simply because it has interested him. He worked two weeks on the actual writing of this essay, not including time spent in accumulating source material.
Increasing Crop Yield and Quality by Increasing Soil Fertility

By DALE FUEHRER of Mitchell, Nebraska

What Is Agriculture?

WEBSTER says, "Agriculture is the art or science of cultivating the ground." Since we live in an agricultural country, why should not we know something about the science of restoring to the soil lost minerals, by the method of using fertilizer? Here is an article which might endeavor to prove that by using fertilizer to enrich the soil, one may increase the quality and yield of the crops.

What Is Soil?

Soil can be compared to a warehouse in which are stored plant foods and water from which plants can obtain these necessary elements.*

The soil consists of mineral particles; decaying plants and animals; living organisms, such as bacteria and worms.†

The mineral particles have been formed by the breaking up and decay of solid rock. Rain, air, frost, and streams are some of the agencies that have changed solid rock into soil. Even earthworms and many other small forms of animal life are active agencies in making soil. The decaying plants and animals form the organic matter of the soil which is generally called humus. The soil water and soil air occupy the pores in the soil.§

Kinds of Soil

There are three classes of soils on the basis of the size of the soil particles. Soils made up wholly of very fine particles are called clay soils. Those composed largely of particles of sand are called sandy soils. Soils consisting of large amounts of both clay and sand are called loams. Loams are the most satisfactory soils for most crops, because they are easily cultivated, do not bake, and hold moisture well. Sandy soils dry out rapidly; and clay soils bake in the hot sun after heavy rains.

Color of Soils

The color of soils is due to decaying organic matter and to mineral substances which they contain. The black color of soil is due mainly to the decaying vegetable matter. Even the red clays turn black when fertilized with barnyard manure for some time.

Black soil is not necessarily, as is popularly supposed, a rich soil. However, a black soil is likely to contain a good deal of humus, which aids greatly in plant growth.

The red soil of some soils is due to the red iron oxide they contain. Another form of iron oxide is yellow, and this gives the yellow color so common to clays.

Soil Composition

Plant life requires ten essential food substances. If these elements are not present in proper proportions naturally, which is very seldom the case,
they must be supplied. The substances are oxygen, hydrogen, nitrogen, carbon, sulphur, phosphorus, potassium, calcium, magnesium, and iron. Iron, magnesium, and sulphur are generally present in the soil and it is only in exceptional cases that they have to be supplied. Carbon is received from carbon dioxide in the air. The four almost universal needed plant food substances are calcium, nitrogen, phosphorus and potassium.*

**When Soils Lack Certain Materials**

The elements needed by plants are found in sufficient quantity with but three exceptions: nitrogen, potassium, or potash and phosphorus which all are essential to all plants. These exist in soil in very small amounts, and if plants are continually grown become exhausted. They must be supplied to the land by some means if good crops are to be secured.†

*Why The Soil Needs Nitrogen*

How nitrogen is obtained by the soil is a very interesting relationship between two kinds of plants shown by the sweet clover, alfalfa, soy beans and other members of the bean family or legumes. On the roots of these plants may be found curious little knots or tubercles.‡ One will not always find them on the roots, because they are not formed unless certain bacteria are found in the soil. Those bacteria, the root from the soil, feed upon the food material stored in the plant cells, and produce the swelling known as tubercles. Strange as it may seem, these bacteria are of tremendous value to the plant as well as other living things. They are able to take nitrogen from the air into the soil and manufacture compounds from it. Nitrogen is one of the elements necessary for the manufacture of protoplasm.§ If it were not for these nitrogen bacteria, the time would come when all of the available nitrogen bacteria present in the soil compound would be used up by plants and life would cease to exist.§

Plants which do not have tubercles must obtain their nitrogen from soluble compound of nitrogen in the soil. As a result the supply of these compounds in cultivated fields become less and less each year. Such plants like corn are not attacked by these bacteria and thus have to take nitrogen out of the soil. If corn or a similar crop is grown for any length of time in the same soil the nitrogen is used up.§ In order to return lost nitrogen to the soil a system of rotation of crops is developed. This method of rotating different crops on different fields each year; as, if corn were grown in a soil one year, in order to restore the nitrogen lost, a legume crop such as alalfa is planted the next year. Rotation of crops is one of the most important systems of fertilizing on the farms today.

*Why The Soil Needs Potash*

It is generally known that potassium has much to do with the general tone and vigor of plants; that it increases resistance to certain diseases, that it may tend to offset the effects of too much nitrogen, and that certain crops remove large quantities of it from soil.**

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*The World Book Encyclopedia—Volume 6, Page 2395.
†Moore & Halligan—"Plant Production" Page 15.
§Pieper-Beauchamp & Frank—"Everyday Problems in Biology" Page 239.
**Some Fundamentals of Soil Fertility—Prof. R. I. Threkmorton, Head of Department of Agronomy, Kansas State Agricultural College.
Potassium is found in free ionic form in the cell sap. It does not enter into necessary composition of structural material except as found in glucosides, tannins, and possible pectates when calcium is deficient. It is known that potassium is necessary for the conversion of glucose to starch and in the translocation of carbohydrates. Since potassium is necessary for the conversion of glucose to starch and for the translocation of carbohydrates, the starchy plants usually have a greater need for potassium than do other plants. However, we find that any vigorous quick growing plant such as alfalfa uses large quantities of carbohydrates and therefore frequently uses considerable quantity of potassium.*

Since potassium plays such an important role in physiological activities of the plant it might seem advisable to apply it as a fertilizer if we gave consideration to only the plant requirements and did not consider the composition of the soil. Practically all of the soils which may have been formed from rocks and minerals that came from the Rocky Mountains contain an abundance of potassium. It is true that most of this potassium is not in an available form and it therefore becomes the duty of the man who is managing the soil to supply the necessary conditions from the liberation of the potassium. The most essential requirement is plenty of active organic matter.†

**Why The Soil Needs Phosphorous**

It is not easy to state the exact function of phosphorus in the growth of plants, but it has a close relationship to cell division.‡

Cell division and the formation of fat and albumen will not take place sufficiently without it. Starch may be produced when phosphorus is lacking, but will not be changed to sugar. When phosphorus is absent, grain does not form.§

It is quite generally recognized that phosphorus stimulates root development in the early stages of growth. This effect makes phosphorus of special importance in the production of root crops and for fall seeded crops as winter wheat.§

Phosphorus also stimulates the tillering of cereals. It hastens the maturing of cereals. On the Kansas Experimental farm at Manhattan, wheat growing on plants receiving phosphorus has ripened from one to ten days earlier than the wheat on an adjoining plant that did not receive phosphorus.

The quantity of phosphorus in our mineral soil is low and a fairly large per cent of the total phosphorus is not available to plants because it exists in relatively insoluble aluminum and iron phosphate.*

Such conditions are common in acid soils and also exist to some extent in non-acid soils.*

Fertilizer

According to Webster, fertilizer is any substance that will increase crop yields. Whenever fertilizer is put into the soil it is for the purpose of supplying some necessary substance which is lacking.†

*From Fundamentals of Soil Fertility—Prof. R. I. Threkmorton, Head of Dept. of Agronomy, Kansas State Agricultural College.
Manure As a Fertilizer

The farmers before the time of Christ considered the application of manure one of the principal operations in agriculture and place it next to plowing. King Augeas explained the use of manure to the Greek farmers, and Homer mentions a king who strewed manure with his own hands. Italy immortalizes the man who taught the Roman farmer how to use manure. Manure contains tenfold more plant food than all the commercial fertilizers used in a year. Little attention is given to the care of this manure, and in the country as a whole, nearly half of it is wasted.

Farm manure, commonly called barnyard manure, is derived from the farm itself as a manure from animals or the refuse from crops. The value of barnyard manure is the plant food it contains, the organic matter which it supplies to the soil, and the beneficial action its presence exerts upon the soil organisms. The plant food in manure comes from that taker from the soil by the crops. When crops are fed to animals approximately three-fourths of the nitrogen, phosphorus, and potassium goes with the manure and may be returned to the land. These plant foods are then in a form to become quickly available through decay of the manure.

Value of farm manure varies widely on the type of bedding and the kind of and amount of feeds fed. The following is a table showing the value of fresh farm manure.

<table>
<thead>
<tr>
<th>Percentage Composition</th>
<th>Lbs.</th>
<th>Lbs.</th>
<th>Lbs.</th>
<th>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horse 59</td>
<td>0.70</td>
<td>0.11</td>
<td>0.64</td>
<td></td>
</tr>
<tr>
<td>Dairy 79</td>
<td>0.57</td>
<td>0.10</td>
<td>0.52</td>
<td></td>
</tr>
<tr>
<td>Cattle 78</td>
<td>0.73</td>
<td>0.21</td>
<td>0.46</td>
<td></td>
</tr>
<tr>
<td>Sheep 74</td>
<td>1.44</td>
<td>0.22</td>
<td>0.81</td>
<td></td>
</tr>
<tr>
<td>Swine 74</td>
<td>0.49</td>
<td>0.15</td>
<td>0.59</td>
<td></td>
</tr>
<tr>
<td>Hens 55</td>
<td>1.00</td>
<td>0.35</td>
<td>0.33</td>
<td></td>
</tr>
</tbody>
</table>

Care of Manure

For general use manure is never better than when fresh; therefore the ideal method of handling it is to apply it to the fields without allowing it to stand. Unfortunately this is not practicable. In some parts of the country the feeding of animals directly on the fields is a method which accomplishes the same end.

Where manure cannot be directly applied to the fields, care should be taken to store it properly. The prime essentials in storing manure are first, that it be kept either under cover or in a water-tight pit, to prevent the loss from leaching by the rain; and second, that it be kept compact and moist so that fermentation is retarded.

The use of a manure pit with a water tight bottom, in which manure can be stored, is common in some regions. In this case, the manure should be tramped in so as to exclude the air as completely as possible. If the manure contains plenty of straw or other coarse material most of the rain will be absorbed. The water-tight bottom prevents loss by leaching. A pit with a

1Waters—The Essentials of Agriculture, Pages 92 and 96.
2Dr. Charles H. Kick, Head of Department of Animal Husbandry, Colorado State College.
trampled clay bottom is fairly satisfactory, but one with a concrete bottom is better.

Sometimes, where much bedding is used, the manure may be allowed to accumulate in the stables, although this is not usually practicable in horse stables. Where cattle or sheep are fed, one of the most practical and satisfactory methods of handling manure is to feed the animals under a large shed, if the climate is not too severe, and allow the manure to accumulate during the winter. In such cases the animals keep the manure moist and well compacted, thus retarding rapid fermentation; and as the manure is sheltered from the rain, there is no loss from leaching. The bedding and waste of the feed are mixed with the manure, and the whole makes a manure of good quality. It is sometimes practicable to put the manure from the horse stables into the cattle sheds, where it is mixed with the cattle manure, and the whole is preserved together.

Application of Manure

MANURE is usually applied before planting a cultivated crop, such as corn, and is plowed under, although frequently it is applied as a top dressing to meadows or wheat. The rate of application depends upon many conditions, but eight tons per acre once in four or five years may be termed a good application for plowing under, and from four to six tons an acre for top dressing. On truck farms applications of fifteen tons or more are common. The time of plowing manure under depends mainly upon convenience and the crop to follow. If the manure is coarse, it should be plowed under as long in advance of planting as possible, so that it may have ample time in which to decay and thus make available the plant food which it contains; but if it is well rotted, early plowing in is not so important. A manure spreader is recommended for every stock farm, as it saves labor and spreads the manure evenly, thus causing the manure to go farther and bring a large return.

Commercial Fertilizers

ALTHOUGH manure is a good fertilizer, it is somewhat lower in phosphorus than in nitrogen and potassium, due to the fact that considerable quantities of phosphorus are retained in the bones of the animals, especially if the animals are growing rapidly. Consequently, it is often wise, particularly on soils deficient in phosphorus, to add phosphate to the manure before the manure is applied.

The widespread use of commercial fertilizers dates from the discovery by the German chemist Van Leeuwenhoek, of a method of obtaining acid phosphate from bones by treating them with sulphuric acid. Two years later in 1842 a process of making acid phosphate from phosphate rock was perfected in England. Other process for securing the mineral substance needed by growing plants have been devised and are sold commercially all over the world. A mineral manure, bones, and other natural sources of plant food are valuable fertilizing materials, but in most cases, these are not obtainable in sufficient quantities.

*Waters—The Essentials of Agriculture.
†The World Book Encyclopedia Vol. 1, Page 96.
‡Ohio Experiment Station—Circular 13, Page 645.
A N INTERESTING experiment on the importance of phosphorus has been performed. Two grades of manure were used, one (called stall manure) taken directly from the stable, the other (called yard manure) such as had accumulated in a heap in an open lot. Each of these two kinds of manure was divided into three lots, one lot of each receiving 40 lbs of rock phosphate per ton, another 40 lbs. of acid phosphate per ton, and the third receiving no phosphate. The various lots of manure were then compared as to their effect upon the yield of corn, wheat, and clover grown in rotation through a series of several years, the manure being applied at the rate of eight tons per acre on clover sod before plowing the corn. The following table shows the money return per ton of manure in an average round of the rotation.

<table>
<thead>
<tr>
<th>Manure and Treatment</th>
<th>Increase Per Ton of Manure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stall manure without phosphate</td>
<td>$3.33</td>
</tr>
<tr>
<td>Stall manure with rock phosphate</td>
<td>4.53</td>
</tr>
<tr>
<td>Stall manure with acid phosphate</td>
<td>4.88</td>
</tr>
<tr>
<td>Yard manure without phosphate</td>
<td>2.55</td>
</tr>
<tr>
<td>Yard manure with rock phosphate</td>
<td>3.63</td>
</tr>
<tr>
<td>Yard manure with acid phosphate</td>
<td>4.17</td>
</tr>
</tbody>
</table>

This experiment not only shows a good money return from adding phosphate to the manure applied to a soil needing phosphorus but also shows that the stall manure which receives proper care is more valuable than the yard manure which is exposed to the weather.

As a result of such experiments as this, it is becoming a common practice in some parts of the country, particularly in the corn belt, to apply from 60 to 100 pounds of phosphate to each ton of manure before scattering it on the land. Phosphate may be applied from time to time as manure accumulates, or it may be added to the manure in the spreader, plowing it under for corn or other cultivated crops.

The following table shows the increased labor efficiency from use of fertilizer indicated by average yields in long time experiments on fertilized and unfertilized plots.*

<table>
<thead>
<tr>
<th>Crop</th>
<th>Yield per Acre Unfertilized</th>
<th>Yield per Hour of Labor Unfertilized</th>
<th>Yield per Hour of Labor Fertilized</th>
<th>Increase Labor Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat</td>
<td>12.5</td>
<td>11.7</td>
<td>1.07</td>
<td>2.53</td>
</tr>
<tr>
<td>Wheat</td>
<td>11.5</td>
<td>11.7</td>
<td>.98</td>
<td>2.39</td>
</tr>
<tr>
<td>Corn</td>
<td>27.2</td>
<td>19.0</td>
<td>1.43</td>
<td>2.45</td>
</tr>
<tr>
<td>Oats</td>
<td>31.9</td>
<td>13.0</td>
<td>2.45</td>
<td>3.94</td>
</tr>
</tbody>
</table>

Agricultural Year Book—U. S. Department of Agriculture.

Kinds of Fertilizers

**Nitrogenous Fertilizers:** Fertilizing material containing nitrogen may be divided into two general classes; animal products and plant products. Among the common animal products are wastes from the slaughter houses, such as dried blood and tankage. With these may be classed the guanos, made up of the excrement of sea fowls, gathered from islands of the west coast of Africa.

* Agriculture Yearbook—U. S. Dept. of Agriculture.
† Waters—Essentials of Agriculture, Page 103.
‡ Waters—Essentials of Agriculture, Page 104.
The common materials derived from the plant world are cotton seed and cotton seed meal, linseed meal, and castor pomace. Other products as sodium nitrate and ammonium sulphate, are quite largely used.†

The use of nitrogenous fertilizers is confined largely to regions where heavy fertilization of the soil is practiced. In general, the more soluble forms should be applied at such times and in such quantities as to be of immediate use to the plants, as otherwise they will leach from the soil and be lost.†

On the other hand, these forms coming from animal and plant products are more slowly available, since the nitrogen must be acted upon by bacteria in the soils; hence, these forms may be used with less danger of the nitrogen being lost by leaching.

**Phosphatic Fertilizers:**

PHOSPHATIC fertilizers are obtained from two main sources, animal and mineral. Among the animal phosphates are the bone meals, waste products of the slaughter houses and fish scrap. The important mineral phosphates are rock phosphate, basic slag, and acid phosphate.‡

Phosphorus from mineral sources is but slightly soluble in water. When treated with an acid-like sulphuric acid, however, a part of the phosphorus is changed to a form that is slowly soluble in salt water which contains carbonic acid. Phosphorus in either of these forms is considered available to plants. It is known commercially as available phosphorus and commands a higher price than does phosphorus in an available form.‡

Phosphatic fertilizers are the most widely used fertilizing materials. The acid phosphate, the quick-acting form of phosphorus is most extensively used in Southern and Eastern states. The bone meals and the basic slag are moderately quick acting, the former being used largely in central U. S. near the large slaughter houses, and later in European countries. The raw phosphate rock is used mainly in the corn belt.†

**Potassium Fertilizers:**

THE main source of potassium fertilizers for the world is the Stassfurt mines in Germany. It is calculated that there is sufficient potash in these mines to last the world five thousand years at the present rate of consumption. The most common crude salt is known as kainite, which contains approximately 10% of potassium. The crude salts from the mine are dissolved and recrystallized, thus securing purer forms of potash salts for the fertilizer trade.‡

Potash fertilizers are used in the U. S. Mainly in mixed fertilizers and on special crop, such as potatoes and tobacco, which require much potassium in their growth. In European countries near the potash mines they are used more extensively on general crops. The forms having the widest use are the chloride and sulphate of potash, which are perfectly soluble and the potassium readily available to plants. The rate of application of either of these varies for different use from twenty-five to two hundred pounds per acre.†

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*Waters—Essentials of Agriculture, Pages 105-106.
†Waters—Essentials of Agriculture, Pages 110.
‡Waters—Essentials of Agriculture, Pages 108-110.
Lime:

LIME is regarded as a fertilizer in the true sense of the word, as it is not added for the purpose of supplying plant food. Calcium, the important constituent of lime, is an element of plant food, but almost all soils contain enough of this element in proper form for plant use. If applied in large quantities, lime improves the mechanical condition of soils by making stiff, heavy soils lighter and more mellow, and by making sandy soils more compact.

Lime also promotes favorable chemical changes by favoring the development of beneficial bacteria, by preventing phosphorus from uniting with iron and aluminum and by helping to make the potash in the available. It is also necessary in the changing of the nitrogen of ammonia to nitrates. Lime is the most effective agent with which to improve sour, or acid soils.

What A Fertilizer Formula Means

One of the most common types of fertilizer on the market is one having a composition of about 2% ammonia, 8% of so-called available phosphoric acid, and 2% of water soluble potash. It is common in the trade to speak of such a fertilizer as “two-eight-two.” In the same way, one containing 3% ammonia, 10% of available phosphoric acid, and 5% of water-soluble potash is called a “three-ten-five.”

Fertilizers usually contains a large amount of inert matter, commonly known as a “filler,” along with a comparatively small amount of plant food, since it is necessary to have a certain bulk in order to apply the fertilizer evenly.

Conclusion

This article has proven, or endeavored to prove why artificial fertilizer should be used, why, when using fertilizer, that it increases the quality and yield of crops. It has proven that if a soil is lacking in certain foods, that they must be restored or the land will grow absolutely worthless. One should scientifically treat his land with a proven commercial fertilizer to get the best results from crops.

The “Big 4” of Fertility

SOIL FERTILITY, according to T. G. Stewart, soil conservation specialist for Colorado State college extension service, can be maintained by planning and carrying out a farm program which includes four important principles:

1. Rotating crops, including feed crops and soil-conserving crops in the rotation.
2. Live stock to consume all of the feed and pasture crops produced on the farm, and the return of all of the manure and crop residues to the fields.
3. Proper use of irrigation water and rainfall to reduce leaching and soil erosion.
4. Application of commercial fertilizers to supply those plant foods which may be needed. The best way to find out what fertilizer is needed on any farm is to treat a small plot or strip across the field.

The principle of maintaining soil fertility is simple, and may be stated, Stewart says, as follows:

“Return to the soil as needed the plant food which is lost in the sale of crops and live stock, in leaching and in soil erosion.”
A Beet Contract Provides Insurance Against Total Loss of Crops That Can Be Destroyed by Hail!

Below you see George Dorsch of Scottsbluff in his beet field and in his grain field June 15, 1939, following severe hail. The beets look shot to pieces. The barley took a terrific beating, too. But even the barley looks better than the beets.

Below you see the same fields July 10. Note the beautiful recovery the beets are making, but now the barley looks worse. Out of curiosity, the straw from this field was threshed. It yielded 1.4 bushels per acre! Not even returning the cost of the seed!

But when George Dorsch harvested his hailed beets he got

17.81 Tons
PER ACRE! AN EXCELLENT CROP!
“High Ten” Grower Leads 4-H Work

Glen (left) and Harold Maul with 4-H calves they will fatten until January, 1941. They are sons of George Maul, well known beet grower, Harmony district.

ONE OF THE foremost 4-H Boys' Clubs of Colorado is the Timnath-Harmony Club, which has had for its leader for several years, Bryan F. Shader. Mr. Shader was one of the ten highest-yield beet growers in the Fort Collins district in 1939.

For three consecutive years this club has had the honor of having one of its members on the team of two 4-H Club boys selected to represent Colorado at the national 4-H camp at Washington, D. C.

Last year this honor was won by Harold Maul, who has been outstanding in live stock judging, feeding and various club activities for several years. Harold has also been a member of the state championship 4-H club stock judging team and of the state championship demonstration team. The Hereford steer he fed last year won first prize out of 55 entries at the National Western Stock Show in 4-H club competition.

Benny Shader was a member of the county live stock judging team at the state fair last year. He won 4th prize in 4-H competition with his Angus steer and first as well as reserve championship with his Hampshire barrow. Gilbert Fisher won second at the state fair with his Short Horn steer.

The records of these three boys is representative of the group as a whole. A great deal of credit must be given to the leader, Mr. Shader. He has given a great deal of time to the boys of this club and their records of accomplishments amply prove the effectiveness of this efforts.—Harvey Riddell.

Sylvester Yahn of Crook, Colorado, solved the problem of inadequate protection for his cattle this winter. He had 42 head of 300-pound steer calves going into the winter with no wind break and no shed. With only a few days' work and with very little cost he made a straw shed 20 feet wide, 40 feet long and 8 feet high with straw walls and roof 2½ feet thick all supported by woven wire. Syl says, “Those calves didn't even know we had winter.”

Harvey Geis is hauling manure from the Cluck ranch in Banner county, a distance of more than 20 miles, to his farm near Scottsbluff. High yields repay him for this work.
One of the secrets in securing a good stand of alfalfa is early seeding, according to Victor H. Akin, Giddings station, Fort Collins. Mr. Akin drills alfalfa seed before the first of April with a press drill on a well-packed seedbed without a nurse crop and always gets his stand. This press wheel differs from the conventional drill in that he has reconstructed it so that the disks and press wheels are only 4 inches apart.

Anthony Aranci of Fort Collins is using a mechanical manure loader to help get the manure on the beet fields early and quickly. Mr. Aranci realizes the importance of getting the seedbed prepared early in the spring. Anthony, who is a former student of Colorado State college, operates one of his father's farms west of Fort Collins.

O. F. Westerdoll of Redmond station and Alex Watson of the Harmony district, Fort Collins, are utilizing their cured beet tops to the fullest possible extent by grinding and mixing with low quality ground hay for fattening lambs. Wastage of either hay or tops is minimized, and the economical use of tops is further extended into spring feeding operations by this method.
Last fall Carl Wisroth of Pine Bluffs, Wyoming, filled a trench silo with equal parts of green beet tops and cut corn fodder. Says Mr. Wisroth: "Getting the tops in early eliminates a lot of the dirt and loss of feed value from exposure. The siloing increases the feed value of both the beet tops and the corn fodder and makes a very palatable feed."

G. P. Frank, northwest of Scottsbluff, recently purchased the farm adjoining his home place. His son, William, will operate this farm.

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FORESIGHTED LAST YEAR—ON THE JOB NOW!

Growers in the Wellington district remember only too well the experience of the spring of 1939 when they endeavored to plow and prepare seed beds. Just before March 27 most growers had found the soil too dry to work well and after that date this same soil was so wet that plowing was equally difficult.

Richard Keirnes, one of the outstanding growers of this district was one of the most foresighted last spring. Undoubtedly the greatest factor of his success in 1939 was his early seed bed preparation. He plowed all his beet ground before the 15th of March with a pulverator plow followed by a Campbell packer and then completed his seed bed preparation immediately, thus allowing him to have his planting finished by the 6th of April.

His 1940 beet ground was manured early and will be plowed in March if at all possible.

—John D. Petrikin.
George Schlotthauer, right, of Gering, said that after his experience last year he was going to prepare his land early this season and plant his beets just as early as possible.

In addition to early seed bed preparation, E. B. Ackelson of Laporte has found the use of phosphate to be profitable. Mr. Ackelson always applies phosphate to the beet crop. In the past few years he has also applied phosphate to other crops. One year he applied phosphate to the corn crop and the succeeding year the carry-over effect of the phosphate could be seen in the barley field. Mr. Ackelson is manuring his beet land and will also apply phosphate again this year.

"For the land's sake!" was a good slogan heralding the arrival of the Fertility Train at Loveland, where manure and phosphate were used to make a striking display. From January 22 through February 24, 18,529 persons visited the train in Colorado, Nebraska, Wyoming and Montana.
Table of Contents

Retail Price of Refined Sugar and Per Capita Consumption  38
Increased Beet Acreage Indicated  39
Timely Planting Averaged 2 ½ Tons Better Than Late  41
... for G-W Territory in 1939
Suggestions on Seed Beds and Planting  42
What Good Is Research?—Dr. H. E. Brewbaker  45
A Phosphate Demonstration at Cowley—Ralph J. Stahle  51
How Much Water Does It Take?—T. Stevens  52
Not... Gone With the Wind!  54
Colorado Pushed Fall Work for 1940 Crop  55
Feed Value of Beet Tops  56
Pioneer Land: The Other Side of the Story—Lyman Andrews  58
$25 Grand Prize to Dale Fuehrer  62
Increasing Crop Yield and Quality by Increasing Soil  63
Fertility.—Dale Fuehrer
The "Big 4" of Fertility  70
A Beet Contract Provides Insurance Against Total  71
Loss of Crops That Can Be Destroyed by Hail!
"High Ten" Grower Leads 4-H Work  72
Around the Territory  73
You, Mr. Farmer . . .

are the man on the cover!

THESE men are working for you! They want to do the job right. You want them to do it right. Show them how you want it done. "Learning by showing" is the first step in "learning by doing!"

Show them why closer spacing and uniform spacing produce highest yields per acre. Explain how some beets are lost between thinning and harvest and why it is so important for them, and for you, to secure the best thinned stand possible.

Supervise the Work Every Day!
Why Youth Favors Beets

HOW sugar beets appeal to the younger generation is illustrated by the 4-H Club and F. F. A. activities described in this issue. It was not possible to secure names and pictures of all the boys undertaking these projects in time for publication. As the work progresses we shall print more.

Sugar beets are attractive to boys for the same reason they were attractive to their fathers and grandfathers who pioneered the industry in this region. The beet crop offers employment to the fellow who wants a job, and the more time he puts in, the greater the return. Other standard crops are more limited. There's only so much work that can be done, and beyond that point, extra effort is not rewarded with extra pay. But beets offer a larger labor opportunity and consequently a larger labor income.

This aspect of the beet crop accounts largely for its growth and development. Many a farmer and landowner started years ago with little or no money of his own. His own work was about all he had to offer. The beet crop gave him a chance to "buy himself a job." And after buying a job, he was able to buy equipment and, in hundreds of cases, buy land.

A LARGER acreage of beets was planted earlier this year than in any year of Company record. Over most of the territory timely precipitation has given good to excellent germination stands. Contracting is still continuing. It is expected that final contracted acreage will approximate 225,000 acres. While the early reservoir situation has been short of desired supply, it must be remembered that rainfall in the crop year has greater relationship to final yields than any estimates based on early reservoir supplies. The immediate job is to secure the best thinned stands good supervision can achieve—and to keep the crop growing with timely irrigation, using available water as it is needed, rather than letting the crop suffer with view to hoarding water for later use.
The harvest tells the story. Remember that some beets will be lost between thinning and harvest. That's why it's safer to use closer spacing. Denzel Hartshorn believes in close spacing. He has averaged 20.26 tons per acre on an average acreage of 35.04 acres over the past eleven years! An excellent 11-year record.

What Constitutes a Satisfactory Stand?

By DR. H. E. BREWBAKER
Agronomist, Longmont Experiment Station

Every consistent producer of sugar beets has certain more or less definite ideas with regard to proper stand for maximum yields. Peculiarly enough, those growers who have attained the largest measure of success are very often the most interested in this, or any phase of sugar beet culture, which may offer possibilities for improvement. This is but a characteristic by which success in any line is conditioned.

In order to present a reasonably accurate picture of the part which stand plays in promoting good yields of sugar beets, I shall risk being ridiculous through extreme simplicity.

If only one beet is grown on an acre of ground it may develop into a 5, 10 or even 20-pound beet, depending upon the inherited capacity of the individual beet to utilize the soil fertility and moisture available at the particular spot where the beet is growing. With two beets growing far enough apart so that they are not in
competition with each other, the yield per acre will be twice that produced by only one beet. And so we may continue to increase the number of beets with a direct proportionate increase in per acre yield until it becomes necessary to space the plants so close that they begin to compete for the necessities of plant life, namely, sunlight, plant foods, and moisture.

The spacing interval at which sugar beets begin to compete with each other is probably less than 4 feet. When beets are spaced 4 feet apart each way, an acre of ground will contain about 2700 beets which is approximately 10% of a full stand of 12-inch spacing in 20-inch rows. Beets planted 4 feet apart may compete some with each other, but total per acre yields continue to increase with increasing stands until the stand is thick enough to assure the most efficient utilization of the sunlight, soil plant foods and moisture.

The picture which I have just tried to present may look something like the accompanying graph, Figure 1.

![Figure 1](image_url)

**Figure 1.** With perfect stands, with no skips or gaps, and uniform spacing between beets, the highest yields may be expected with spacing somewhere 8 to 14 inches apart, using 20-inch rows. Uniform spacing means a beet every 8 inches where 8-inch spacing is desired, or a beet every 14 inches, where 14-inch spacing is desired.

You will note from this more or less theoretical curve (based, however, upon sufficient experimental work to be approximately correct) that the per acre yield increases directly with the stand up to a certain point, perhaps around 3 to 4-foot spacing. From that point on to 12 or 10-inch spacing, the yield increase becomes less and less with each increment in closer spacing. The largest yields may be expected with perfect stands and uniform spacing somewhere around 8 to 14 inches apart using 20-inch rows. With
wider or narrower rows some proportionate change in spacing would be necessary to maintain the most efficient stands. Tonnage yields of marketable roots will certainly decrease when stands become too dense.

You will note also that the discussion thus far has dealt principally with uniform spacing between beets. These conditions may be approached in experimental work and by the exceptional grower under favorable conditions. But there are many enemies to perfect stands such as wire-worms, cut-worms, cloddy and trashy seed beds, hail, crusted soil, black root disease, cultivator tools and not too careful thinners. And after thinning, pheasants, rabbits, delayed irrigation, webworms and other insects and diseases all take their toll. Even the most expert growers fail at times to get good stands, far short of perfect.

In spite of these possible enemies, the grower who can average 20.26 tons of beets on 35.04 acres for 11 years obviously is succeeding to a large extent, at least, in overcoming these enemies to good stands. The accompanying photograph, Figure 2, was taken on the farm which made this record of accomplishment. This farm is operated by Denzel Hartshorn near Longmont, Colorado. (See Through The Leaves, November, 1939). The 1939 crop on the Hartshorn farm averaged 23.45 tons on 46.24 acres. As this photo shows, the spacing was close, averaging 9.7 inches between beets by actual count.

![Figure 2](image)

*Figure 2. Can you see the measuring tape at the bottom of this picture taken on the Hartshorn farm in 1939? The marks on the tape are 12 inches apart. The spacing averages 9.7 inches. The yield averaged 23.45 tons per acre on 46.24 acres.*

The enemies of perfect stands invariably result in some loss, both before and after thinning. Loss after thinning is the more serious, since every beet lost means a gap in the row. Losses of 15% between thinning and harvest are quite common and much greater losses are frequently obtained. These final gaps in the row become the real source of reduced yields.
WITH perfect stands the best spacing unit may be anywhere between 10 to 12 inches or even with a wider range of perhaps 8 to 14 inches. The gaps resulting from loss after thinning are relatively unimportant with close spacing, but become important sources of lowered yields with wide spacing. The high yields obtained on the Hartshorn farm with less than 10-inch spacing should prove encouraging to the grower who has been somewhat reluctant to try close spacing.

How can uniform stands be obtained? This can be answered, in general, by saying “observe the methods used by such successful growers as Hartshorn and others and adopt similar good management practices.”

Further evidence of the value of good stands is shown by the accompanying results of statistical studies made by the Great Western Sugar Company for 1939. (See Figure 3.) These results are similar to those for previous years which have been published at various times in Through The Leaves.

<table>
<thead>
<tr>
<th>No. of Beets Per 100 Ft. of Row</th>
<th>No. Contracts</th>
<th>% of Total</th>
<th>Tons per A.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-29</td>
<td>383</td>
<td>3.6</td>
<td>3.8</td>
</tr>
<tr>
<td>30-39</td>
<td>731</td>
<td>7.0</td>
<td>6.5</td>
</tr>
<tr>
<td>40-49</td>
<td>1616</td>
<td>15.4</td>
<td>8.4</td>
</tr>
<tr>
<td>50-59</td>
<td>2415</td>
<td>23.0</td>
<td>10.4</td>
</tr>
<tr>
<td>60-69</td>
<td>2427</td>
<td>23.1</td>
<td>11.8</td>
</tr>
<tr>
<td>70-79</td>
<td>1815</td>
<td>17.3</td>
<td>13.0</td>
</tr>
<tr>
<td>80-89</td>
<td>819</td>
<td>7.8</td>
<td>14.2</td>
</tr>
<tr>
<td>90-99</td>
<td>233</td>
<td>2.2</td>
<td>14.6</td>
</tr>
<tr>
<td>100+</td>
<td>58</td>
<td>0.6</td>
<td>15.9</td>
</tr>
</tbody>
</table>

Total 60.9 10497 100.0 11.34

| Figure 3. Notice how the tonnage per acre increases as the number of beets per 100 feet of row increases. You see that there were 58 growers who averaged 100 or more beets per 100 feet, which means 12-inch spacing or less, who harvested the highest average.

A satisfactory stand is one which produces the highest net return per acre. Relatively close spacing, of 10 to 12 inches, is not to be feared since many growers of consistent high yields generally obtain such stands. Close spacing will admit of some loss in stand with slight loss in yield since the beets adjacent to small gaps grow
Mechanical blocking has come to stay. These pictures were taken at Fort Morgan, last year. Robert Yearous (4) is cross-blocking with crooked-shank duckfeet, and the others are using the Dixie blocker: (1) David Eckhardt, Jr., (2) Farm of John A. Snyder, (3) Carl Friehauf, and (5), the blocker on the farm of Erik Eriksen.

larger to the extent of compensating almost, if not completely, for such loss in yield; this is not possible with large gaps. And finally, aim at a closer stand than you expect, for as was shown by Asa C. Maxson in the May, 1939 issue of Through The Leaves, the average stand left in 13 cases studied was nearly 2 inches wider than the stand requested of the thinners.

By trading work, combining equipment and using mechanical manure loaders, several growers at Big Springs, Nebr., were able to get more manuring done earlier this year than they had done in previous years. H. B. Skoglund and F. R. Anderson made one loader. Wilson Peterman and Walter Rees made another.

J. O. Baker of Mitchell, Nebr., purchased the J. F. Ehlow farm northwest of the experimental farm and is doing quite a bit of leveling, which meets with the approval of Phillip Johannes, the tenant.

As a supplement to ditch water, in order to produce higher yields, six new irrigation wells have just recently been drilled and tested in the Gill, Colo., district. The deepest was 90 feet on the Henry H. Reichert farm. The Gotfred Hoffner well has the largest capacity for a single hole—over 1,100 gallons a minute. The other four are good producers on farms owned by Herman Sanders, Conrad Hoff, Farm Investment Company and W. S. Miller. Prior to these, there were 40 irrigation wells in the Gill area.
Farming Two Years in One

Jake Uhrich, Jr., will fight bindweed and conserve moisture with this field cultivator.

Jake Uhrich, Jr., Factory district, Fort Collins, is a farmer who plans his work ahead and endeavors to solve as many of next year's problems as possible this year.

Mr. Uhrich is tenant operator of a large farm on which some fields have become infested with patches of bindweed. With a limited irrigation water supply available, he decided to combine clean cultivation for eradication of all bindweed from infested fields with summer fallowing to increase the water supply for all cropped fields.

The landowner has cooperated in carrying out Mr. Uhrich's plan by furnishing a 9-foot cut-field cultivator equipped with 16 duck feet each 10 inches wide. This cultivator will be used this year on 10 acres infested with bindweed and on an additional 50 acres of fallow land to be prepared for cropping next year.

The benefits to succeeding crops from summer fallowing involving the conservation of moisture, the stimulation of bacterial action, and the eradication of weeds, have already been proven to be very marked on a number of other farms in this area.

Mr. Uhrich's combined objectives, which merit commendation and the consideration of other farmers with similar problems, will undoubtedly be attained. When he undertakes any farm job he does it well.

—John Latta.

Raymond Pyle of Proctor, Sterling factory, made a good seed bed for beets out of a 1939 corn field by first fertilizing, then using a disk plow, which consists of two 26-inch discs. This method cuts the stalks and brings the roots to the surface where they are thoroughly chopped by double discing, then plowed under and worked down in the usual manner.
MANY a tale of hardship and endurance could be told of these men who make long trips into the high country to make snow surveys as an aid to forecasting irrigation water supplies.

The bare statistics which finally are printed give little hint of the long hikes and hard work that go into this activity. The men shown here are using the measuring instruments described by Mr. Parshall in the accompanying article.
How Snow Surveys Are Made
Irrigation Forecasts Aided by Program Started in 1935

By R. L. PARSHALL
Senior Irrigation Engineer, Division of Irrigation, Soil Conservation Service,
U. S. Department of Agriculture, Fort Collins, Colo.

SNOW surveys for the purpose of forecasting irrigation water supplies are being made throughout the Rocky Mountain areas of Colorado, Wyoming, New Mexico and Arizona, as well as in other states of the West. This project was started in the summer of 1935 in Colorado and Wyoming, and later in the states of New Mexico and Arizona by the Division of Irrigation, Bureau of Agricultural Engineering. It is now directed by this same division as a unit of the Soil Conservation Service. This work is carried on in cooperation with the Forest Service, National Park Service, Bureau of Reclamation, Weather Bureau and other federal agencies, as well as with experiment stations, state engineers, and others.

The surveys are made systematically over what are called snow courses, located at definite places in the high mountain country, where several samples of the snow are taken at uniform intervals along lines marked by appropriate signs fixed to trees or high posts. These snow courses are established at elevations of 8500 to 11,500 feet, usually in a sheltered nook or small open park in the forest. The lay-out ordinarily consists of two intersecting straight lines over which the sampling is done with the intention that, if drifting occurs, the average of the several observations will represent a true measure of the amount of water held as snow storage.

SPECIAL snow sampling equipment is used in making these surveys. This apparatus consists of jointed tubes 30 inches long which can be extended to any length necessary to reach through the full depth of the snow. The dry tube is weighed carefully by means of a tubular spring balance; then the snow sample is taken by thrusting the tube vertically downward through the snowpack until the bottom end rests upon the ground surface beneath. By means of graduations along the side of the tube the full depth of the snow cover is observed, vertical slots through the walls of the tube permitting the surveyor to see the top of the snow core within. For a representative sample the length of the core should be about 10 per cent less than the depth of snow at the place of sampling. The tube with its core is withdrawn and the weight determined. The difference between the initial and final weighings is the water content of the sample of snow, in inches.
For the season of 1940 there were reported to headquarters at Fort Collins 75 active snow courses in Colorado, Wyoming 39, New Mexico 16, and Arizona 7. These surveys are made regularly the first of each month, February, March, April and May, and reports are immediately issued covering the water supply outlook for the coming season. Separate monthly reports are issued for the Colorado river, Rio Grande, and Missouri-Arkansas drainage basins. Because of the importance of water for irrigation, special mid-month reports have been made to supply immediate information as to the prospects for runoff this coming season.

The following summary shows the comparison of the water content of the snow on May 1, 1940, with that of last year and of the five-year average for several drainages in Colorado and Wyoming:

<table>
<thead>
<tr>
<th>Watershed</th>
<th>Number of Courses</th>
<th>Percentage of May 1, 1939</th>
<th>Percentage of Five Year Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Platte River</td>
<td>11</td>
<td>91</td>
<td>86</td>
</tr>
<tr>
<td>South Platte River (1)</td>
<td>3</td>
<td>57</td>
<td>74</td>
</tr>
<tr>
<td>Laramie River</td>
<td>8</td>
<td>78</td>
<td>71</td>
</tr>
<tr>
<td>Poudre</td>
<td>7</td>
<td>78</td>
<td>78</td>
</tr>
<tr>
<td>Big Thompson</td>
<td>2</td>
<td>79</td>
<td>83</td>
</tr>
<tr>
<td>St. Vrain</td>
<td>1</td>
<td>81</td>
<td>82</td>
</tr>
<tr>
<td>Boulder</td>
<td>2</td>
<td>79</td>
<td>82</td>
</tr>
<tr>
<td>Clear Creek</td>
<td>1</td>
<td>52</td>
<td>68</td>
</tr>
</tbody>
</table>

(1) Above Denver.

Reservoir storage throughout the North and South Platte valleys was below that of May 1 last year. In the North Platte basin it was about 40 per cent; upper South Platte, 76; lower South Platte, 60; Poudre, 42; and for the Thompson and St. Vrain the storage was about 15. However, since the first of the month the extent of filling has increased somewhat.

Storms during April have materially improved the soil moisture conditions throughout the irrigated areas of both the North and South Platte valleys as well as added to the amount of water in snow storage at the high elevations in the mountains.

Wilhelm Lind, Morrill, Nebr., grower, is continuing his operations in successfully combining feeding with cash and feed crops.

R. J. Grams of the Auburn district, one of the 1939 "high ten" growers in the Greeley district, started thinning beets with the aid of the Dixie cotton chopper on May 1, 1940.

Peter Gerk and W. McGrew, of Sedgwick, Colo., are planning to have plenty of irrigation water for future use. Both men are drilling wells on their farms.

Lester Kaasch purchased the Mrs. Carl Wright farm north of the Marlin dump. Homer Cline is still the tenant.
Colorado 4-H Boys Form Beet Clubs

By C. W. FERGUSON
State Club Agent, Colorado Extension Service

"TO LEARN by doing" had been one of the 4-H club mottoes for many years. Yes, farm boys and young men of northern Colorado are learning to grow sugar beets thru 4-H club work. Four-H club work has found through its 26 years of life that the best way to teach our farm boys and girls the improved practices in farming and homemaking is for them to actually do the work. It is one thing to read the directions out of a book but it is an entirely different thing to actually do the job.

In order to secure the best yield or greatest gain at the cheapest cost, one must give some thought and study as to how to obtain the best results. Many of our 4-H club members are making a deal with their dads so they can rent from them one to five acres of land to plant beets under their own contract.

These junior growers are gaining the experience of actually doing all of the work of growing a crop of beets. A special record book has been prepared by the Extension Service of Colorado State College of Agriculture and Mechanic Arts in which the boys will record all their expenses in connection with the growing and marketing of their crops.

Every farmer is interested in using the best cultural practices in growing a crop to derive the greatest yield and financial benefit from it. These 4-H club members endeavor to do the same.

Four-H club work is nothing new. It has been a functioning organization even before the beginning of the World war in 1914. The growth in membership has been gradual until there are now over a million and a third club members in the United States and its territories.

During the year 1939, close to 14,000 boys and girls and young men and women received practical training in farming and homemaking through 4-H club work in Colorado.

The purpose of 4-H sugar beet club work is to: (1) demonstrate the place of sugar beets in the economy of irrigated agriculture, (2) interest the best young people on our irrigated farms to stay on the farm, (3) demonstrate the best practices of beets and calves go well together, according to Richard and Lynn Keirnes, Eaton 4-H Beet Club enthusiasts.

Out to beat dad's tonnage records! Five F. F. A. boys of the Brush, Colorado, High School, with 1940 sugar beet projects, left to right: Loren Moeller, Robert Danielsen, George White, Jr., Calvin Lucht and Reuben Bastron.
Extra effort makes extra tons per acre. And these 4-H Club boys from Brush are out to show how it is done; front row: Hugh Grigg, Conrad Helmut, Robert Peterson and Russell Woodward; back row, Arnold Peterson, Raymond Baughman, Thomas Garrett and Richard Mengel. These boys are from the Snyder and Roosevelt communities. The Club leader is Thomas Garrett.

sugar beet culture, and (4) show the development of and profit to the club members.

The boys will work hard this spring, summer and fall to see if they cannot beat their fathers' records. The following are the Colorado 4-H Beet club boys now undertaking projects:

<table>
<thead>
<tr>
<th>Name of Member</th>
<th>Address</th>
<th>Age</th>
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<tbody>
<tr>
<td>Mr. James Green, Brighton, Colorado, Local Leader</td>
<td></td>
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</tr>
<tr>
<td>Herman Schwab</td>
<td>Route 1, Box 28, Brighton</td>
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<tr>
<td>Ben Schwab</td>
<td>Route 1, Box 28, Brighton</td>
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<tr>
<td>James Diamond</td>
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<td>James Green</td>
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<td>Ray Green</td>
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<td>Donald Dreyer</td>
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<td>Henry Mancini</td>
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<td>Mr. James Fry, Henderson, Local Leader</td>
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<td>James Erger</td>
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<td>Mr. C. F. Burke, Brighton, Local Leader</td>
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<td>Charles Klessig</td>
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<td>David Keller, Jr</td>
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<tr>
<td>Name of Member</td>
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<td>Mr. Elzie Garrett, Snyder, Local Leader</td>
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<td>Hugh Gregg</td>
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<td>Russell Woodward</td>
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<td>Mr. John Bostron, Atwood, Local Leader</td>
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<td>George Schaffer, Jr.</td>
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<td>Eugene Eisenach</td>
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<td>Elvy Wagner</td>
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<td>Mr. S. Y. Cooper, Padroni, Local Leader</td>
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<td>Mr. R. E. Hielscher, Iliff, Local Leader</td>
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<td>Victor Marostica</td>
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<td>Clyde Benedict</td>
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<td>Tsune Losuge</td>
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<td>John Cunningham</td>
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<td>Eldon Monroe</td>
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Closer spacing of beets in the row is one of the practices these Longmont District 4-H Beet Club boys are depending on to give them high tonnage: (1) James Stengel, (2) Fred Kolb, (3) Erik and Preben Bonde, (4) Walter Hansen, Jr., (5) Gale Hansen, (6) Robert Gunst, (7) Ervin Olson, (8) Bert Vincent Roe, (9) Howard Borgmann, (10) Roy Herrin, and (11) Gordon Kennedy. Leaders, not shown in pictures, are Edwin A. Anderson, Elza Harroun, Harold DeBacker and A. F. Southwick.
A fine start has been made by these 4-H Beet Club boys of Logan county, Colorado, front row, left to right: Tsune Kosuge, Harold Brecht, Harold Stumpf, Leo Dick, Robert Le Blanc, Charles Brecht, all of the Crook district under Ovid supervision, and Eugene Eisenach. Back row: Elvy Wagner, George Schaffer, Jr., John Cunningham, Clarence Benedict, Clyde Benedict, Eldon Monroe, Winston Cooper and Eugene Guenzi. Mr. Sherman Hour, Logan County Agent, stands at the rear.

<table>
<thead>
<tr>
<th>Name of Member</th>
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<tr>
<td>Mr. L. C. LeBlanc, Crook, Local Leader</td>
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Mr. Fidele Guenzi, Sterling, Local Leader

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SEDGWICK COUNTY

Mr. Joe Schmidt, Ovid, Local Leader

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Mr. Forest Toyne, Sedgwick, Local Leader

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<td>Jake Shank</td>
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<td>George Hershfeldt</td>
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<tr>
<td>Sylvester Gerk</td>
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Putting the “Win” in Windsor’s 4-H Beet Club: (1) Ben Brunner, (2) Edward Schnorr, (3) Werner Detterer, (4) Walter Feit, (5) Paul Lind. Frank William Lind and his brother, Ted Lind, of the Oklahoma district, were not present when picture was taken. Paul Baedke is Oklahoma club leader.

<table>
<thead>
<tr>
<th>Name of Member</th>
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<tr>
<td>Lyle Dean Heil</td>
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<td>Tadao Shimamoto</td>
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<td>Harry Shimamoto</td>
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<td>Jimmie Shimamoto</td>
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<td>15</td>
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<tr>
<td>Minoru Kinoshita</td>
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<td>Toshi Inouye</td>
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<td>Tome Inouye</td>
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<tr>
<td>Akira Otsuka</td>
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<td>Kamoe Otsuka</td>
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<td>Tsugio Yoshimoto</td>
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<td>Tsuruo Otsuka</td>
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<td>Tom Kobayashi</td>
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<td>Hisashi Kinoshita</td>
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<td>Charlie Kobayashi</td>
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LARIMER COUNTY

Ray Pitcher, Route 4, Fort Collins, Local Leader

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<td>Bob Lanning</td>
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<td>Jimmie Pitcher</td>
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Frank McConnell, La Porte, Local Leader

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<td>Ivan Fabricius</td>
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<td>Harold Fabricius</td>
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<tr>
<td>William Ackelson</td>
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Mr. B. F. Shader, Route 4, Box 320, Fort Collins, Local Leader

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<td>Edward Blehm</td>
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<tr>
<td>Harvey Weber</td>
<td>Rt. 1, Fort Collins</td>
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</table>
These Greeley and Eaton district 4-H Club boys are working hard on their beet projects for 1940: (1) Ralph Harlem McLeod, Gilcrest; (2) Show Hoshiko, left, and Paul Croissant, Kersey; (3) Ralph Van Buskirk, Evans; (4) Albin M. Magnuson, president of Evans 4-H Club; (5) Gill Community 4-H Beet Club, front row: Carroll Bishop, Clyde Reichert, Glenn Rowe and Herman Hoff; back row, Harold Shern, Harry Hoff, Ralph Anderson and Robert Steward from the Barnesville Club.

<table>
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<th>Name of Member</th>
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<td>Richard Weber</td>
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<td>Glenn Maul</td>
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<td>Bill Moore</td>
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<tr>
<td>Carl Tinsman</td>
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<td>Artur Schultz</td>
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<tr>
<td>Reginald Keirnes</td>
<td>Route 1, Loveland, Local Leader</td>
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<tr>
<td>John Nelson</td>
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<tr>
<td>Gerald Turner</td>
<td>Berthoud, Local Leader</td>
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<tr>
<td>Elmer Kauffman</td>
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**BOULDER COUNTY**

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<tr>
<td>Harold DeBacker</td>
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<tr>
<td>Fred Kolb</td>
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<tr>
<td>James Stengel</td>
<td>Rt. 1, Box 253, Boulder</td>
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<tr>
<td>Mr. A. F. Southwick</td>
<td>Route 1, Longmont, Local Leader</td>
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<tr>
<td>Preben Bonde</td>
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<td>Gordon Kennedy</td>
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<td>Erik Bonde</td>
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**WELD COUNTY**

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<tr>
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<td>-------------------------</td>
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<tr>
<td>Merle Weinhold, Evans, Local Leader</td>
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<tr>
<td>Ralph Van Buskirk</td>
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<td>Duane Carter, Route 2, Eaton, Local Leader</td>
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<td>Harlan Schild</td>
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<td>Dr. G. W. Cooper, Keenesburg, Local Leader</td>
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<tr>
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<tr>
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<td>Duane Carter, Route 2, Eaton, Local Leader</td>
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<td>Duane Carter, Route 2, Eaton, Local Leader</td>
<td>Rt. 2, Box 175, Fort Collins</td>
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<tr>
<td>Paul Lind</td>
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Watch the records of these Sedgwick County, Colorado, 4-H Beet Club Boys, left to right: Edward Meier, Ovid, the others being from Sedgwick—Herman Eckhardt, Raymond Heil, Harold Weissgerber, Robert Weissgerber, Reuben Eckhardt and Lyle Heil.
Dad will have to step to beat these 4-H Beet Club boys in the Loveland territory, left to right: John L. Prunty, Jr., Greeley, R. 3; Harold Fahrenbruch, Greeley, R. 3; John Nelson, Loveland; Elmer Kauffman, Berthoud; and Elmer Schmidt, Berthoud. Club leaders are J. L. Prunty, Reginald Keirnes, Herman Carlson and Gerald S. Turner.

<table>
<thead>
<tr>
<th>Name of Member</th>
<th>Address</th>
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<tr>
<td>Francis Dressor</td>
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<td>Phillip Forquer</td>
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<td>Casey Greenwald</td>
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<tr>
<td>Mr. W. D. Nicholson</td>
<td>14th Avenue, Greeley</td>
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<tr>
<td>Ralph Anderson</td>
<td>Rt. 1, Box 114, Gill</td>
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<tr>
<td>Carroll Bishop</td>
<td>Rt. 4, Box 159, Greeley</td>
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4-H Sugar Beet Clubs in Western Nebraska

By C. W. NIBLE, County Agent, Scotts Bluff County, and E. C. NELSON, County Agent, Morrill County

"LEARNING by Doing" is the way thirty-eight boys in three 4-H Sugar Beet clubs, located in Scotts Bluff and Morrill counties, Nebraska, will become more efficient producers of sugar beets by using in so far as possible practices that have given outstanding results.

Records indicate that many years ago some 4-H sugar beet club work was done in Nebraska but this is the first time that definite organizations have been completed, regular lessons outlined and records maintained.

The two clubs in Scotts Bluff county are located in the Lyman and Mitchell factory districts.

The Lyman Sugar Beet 4-H club has enrolled 20 members whose ages vary from 14 to 20 years and they will grow 27 acres of sugar beets. The leader of this club is M. H. Nelson of Lyman and their officers are Robert Flint, Lyman, president; Leon Glenn, Lyman, vice president; Keith Miller, Lyman, secretary-treasurer, and Bill Sleeger, Lyman, news reporter. Other members in the club are: Leo Lilliard, Lyman; Raymond Bower, Lyman; Ed Ruf, Lyman; Eu-
They know why sugar beets are two crops in one! This is the "East 44" 4-H Beet Club of Bridgeport, Nebr., territory, front row, left to right: Leslie Schaffer, Tomie Fotinos and Leonard Vogel, secretary. Back row: Dave Schaffer, reporter, Richard Vogel, president, Melvin Deines and Robert Schmidt. Unable to be present when the picture was taken were Billy Deines and Craig Wood.

gene Prickett, Lyman; Leroy Flint, Lyman; Kent Meredith, Lyman; Robert Middleton, Lyman; Robert Swan­son, Lyman; Bill Meredith, Lyman; Robert Kissack, Lyman; Harry Stam­man, Lyman; Gerald Kissack, Lyman; Albert Hopp, Lyman; Alex Hess­ler, Jr., Lyman; Roy Bauer, Lyman, and Gene Swanson, Lyman.

The Dutch Flats 4-H Sugar Beet club has nine members whose aggregate acreage is 11 acres. The offic­ers of this club are Guy Spencer, Morrill, president; Bert Scott, Jr., Mitchell, vice president; Bernard Gompert, Mitchell, secretary, and Bob Scott, Mitchell, news reporter. In addition to the officers there are the following other members: Stanley Gompert, Mitchell; William J. Franks, Morrill; Robert J. Lenhart, Morrill, and Wal­ter Spencer, Morrill. Allen Gatewood is leader and Bill Gompert, Mitchell, is assistant leader.

C. NIDA of Bridgeport, is the leader of the East 44 4-H Club in Morrill county and Walter Schmidt is assistant leader. This is the first 4-H Sugar Beet club ever organized in Morrill county and is located in the DeGraw community. There are nine members enrolled who will plant a minimum of ten acres of sugar beets. The club officers are as follows: Pres­i­dent, Richard Vogel; vice president, Melvin Deines; secretary, Leonard Vogel, and news reporter, Dave Schaffer. The other five members in the Morrill county club are: Billy Deines, Leslie Schaffer, Robert Schmidt, Tom­mie Fotinos and Craig Wood.
Lyman, Nebraska, is setting a hard pace to beat in 4-H Beet Club work, front row, left to right: Leo Lillard, Gene Swanson, Leroy Flint, Harry Stamn and Albert Hopp. Middle row: Keith Miller, Edward Ruf, Alex Hessler, Robert Middleton, Gerald Kissack and Roy Bauer. Back row: Bill Sleeger, Robert Swanson, Robert Flint, Leon Glen, Kent Meredith, Robert Kissack and Raymond Bower. Unable to be present when the picture was taken were Bill Meredith, Eugene Prickett and Club Leader M. H. Nelson.

All of these 4-H club members have started their work with enthusiasm and parents have shown a great deal of interest in the work these boys are undertaking. The interest is shown in the fact that the Lyman club started with thirteen members at their first meeting and now has twenty members participating in the work. Lessons which will be studied during the club year will pertain to: the history of the sugar beet, crop planning, fertilization, seed bed preparation, planting, cultivating, blocking, thinning, irrigating, harvesting and marketing. Supplementing the lessons will be tours and inspection trips. There are splendid possibilities that the work of the members will serve as demonstrations of better methods of production for a community.

Cooperating with the sugar company and their fieldmen are the 4-H club members, their parents, the extension service of the Nebraska College of Agriculture and the County Agricultural agents. Lesson material will be furnished and record books used by the members.

Lester Repp of Powell, Sterling factory, has an excellent stand of beets on a fall plowed field planted the first week in April. Mr. Repp moved on one of the Colorado Investment & Realty Company farms northeast of Iliff last year and immediately made plans for this year’s crop.
Tomorrow's high-tonnage beet growers in the Big Horn Basin are starting today. Here are some of the F. F. A. boys in the Lovell, Wyo., area: (1) Left to right, Deaver: Harvey Henry, Jr., Squire Dillon, Marsell Wambeke, Russell Webb, and L. A. Berger, instructor; (2) Lovell, front row: Victor Bush, Garth Allred and Alva Tippetts; back row: Alfred Fink, N. D. Lewis, instructor; Joe Good and William Fink; (3) Powell: Ralph Nielsen, Bill Kysar, Mak Kawano and C. N. Peterson, instructor; (4) Cowley: Grant Smith, Dale Benson, Claude Lewis, Jr., and C. W. Rollins, instructor.

Four F. F. A. Beet Clubs in Lovell District

Four clubs in the Lovell, Wyoming, factory area are competing this year for the best sugar beet projects. There is a total of 18 boys that are carrying on beet projects. Their names, ages, and acreage of beets which they are caring for are as follows:

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Address</th>
<th>Father's Name</th>
<th>Acreage</th>
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</thead>
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<tr>
<td>Ralph Nielsen</td>
<td>17</td>
<td>Powell</td>
<td>Niels Nielsen</td>
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<tr>
<td>Bill Kysar</td>
<td>15</td>
<td>Powell</td>
<td>Earl Kysar</td>
<td>5</td>
</tr>
<tr>
<td>Mak Kawano</td>
<td>18</td>
<td>Powell</td>
<td>Y. Kawano</td>
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</table>

C. N. Peterson, Instructor

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Address</th>
<th>Father's Name</th>
<th>Acreage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Victor Bush</td>
<td>15</td>
<td>Lovell</td>
<td>Fred Bush</td>
<td>3</td>
</tr>
<tr>
<td>Garth Allred</td>
<td>16</td>
<td>Lovell</td>
<td>Orvel Allred</td>
<td>2</td>
</tr>
<tr>
<td>Alva Tippetts</td>
<td>16</td>
<td>Lovell</td>
<td>Milford Tippetts</td>
<td>3</td>
</tr>
<tr>
<td>Alfred Fink</td>
<td>16</td>
<td>Lovell</td>
<td>John D. Fink</td>
<td>6</td>
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</tbody>
</table>

N. D. Lewis, Instructor

101
THROUGH THE LEAVES

Name                      Age      Address         Father's Name     Acreage
Joe Good                  17       Lovell          Pearl Good       4
Wm. Fink (1939 Project Winner) 17  Lovell          John D. Fink       6
Doyle Moncur             17       Lovell          J. U. Moncur       2

Cowley
Grant Smith             16       Cowley          H. T. Smith       4
Dale Benson             16       Cowley          L. A. Bensen       3
Claude Lewis, Jr.       15       Cowley          Claude Lewis       3

C. W. Rollins, Instructor

Deaver
Harvey Henry, Jr.       16       Deaver          Harvey Henry       1
Squire Dillon           18       Deaver          S. E. Dillon       2
Marsell Wambeke         16       Deaver          Ivo Wambeke       2
Russell Webb            16       Deaver          Clarence Webb     2

L. A. Berger, Instructor

Last year a contest was sponsored in the Lovell Future Farmers Club under the leadership of Norman D. Lewis, instructor in the Lovell high school. William Fink was awarded first prize for his six-acre project which yielded at the rate of 22.3 tons per acre. His records were kept in an excellent manner, and he is competing again this year. William was also the winner of the essay contest sponsored by the Anaconda Sales Co. in connection with the Soil Fertility train this spring.

Mrs. Mayme H. Johnson of Gilcrest, one of the producers of the ten highest yields in the Greeley district in 1939, began thinning beets May 2. Mrs. Johnson says, "Early planting and early thinning contribute largely to better tonnages per acre."

Clyde and Clarence Benedict of Iliff, Sterling factory, 4-H club boys are off to a good start on their beet projects. Their fields have been manured, thoroughly disced, plowed, harrowed, leveled, phosphated, ridged, planted, and irrigated for germination.

A new irrigation pump is being installed on Fred H. Roberts' farm near Scottsbluff. The pump will be electrically driven, and pumping tests have indicated it will pump 1,100 gallons or more per minute.

Ten townships in the southeast part of Weld county are forming a pest control district for the control of grasshoppers for the next three years.

Emman Shubert, whose land is located southwest of Gering, Nebr., is building a new beet labor house on one of his farms. Henry Krantz, the labor contractor, will appreciate having a good place for his family to live in this summer.

B. A. Serrano, north of Henry, Nebr., is using several commercial fertilizers on his beet ground beside manure. Fertilizers used were: phosphate, ammonium sulfate, potassium chloride, potassium sulfate, wood ashes and a mixture of them. All applications were on light, sandy soil.

F. R. Anderson, Big Springs, Nebr., shipped his cattle to St. Joseph, April 27. This was Franklin's second year of feeding and he expects the added fertility of his farm from feeding to pay him further dividends on this year's crops.
THE WORK on lamb feeding this year was planned from a cooperative standpoint with the Veterinary Pathology, Chemistry and Animal Investigations Sections of the Colorado Experiment Station.

The main purpose of the test was to determine the relation of feed combinations such as those used toward the development of urinary calculi. Five hundred wether lambs were divided into 20 lots, with 25 lambs in a lot. The test ran 140 days for 14 lots, and 125 days for lots 1 to 5 inclusive, and lot 17.

The test can be broken down into 4 main series as follows: Lots 1 to 5 known as alfalfa series, and lots 6 to 10, low vitamin. Lots 11 to 16 inclusive, mineral supplement, and lots 18 to 20 inclusive, comparison of molasses from the standpoint of rate of gain and effect on urinary calculi development. Lot 17 was included in the test which was as follows: white corn, "C" molasses and beet tops and was undertaken mainly from the standpoint of the high ash content.

Many of the feed combinations used in this test may seem impractical to the average lamb feeder. However, they were used primarily for the purpose of testing their relation to urinary calculi conditions in lamb feeding. A few conclusions drawn from the test were:

1. From both the feeders and packers viewpoint a peculiar combination of white corn, beet molasses and beet tops proved cheapest and most efficient. (Editor's Note: The cost of this ration was $5.91 per 100 pounds market gain, which was the lowest cost of any of the rations studied. Cost per 100 pounds gain of other rations ranged from $7.80 to $12.86.)

2. Corn was more desirable as a concentrate with alfalfa than wheat, barley, millet or milo.

3. The dry land grains even though they produce a comparable gain with corn, failed to show the same efficiency as corn in the feedlot, and also failed to show as high dressing per cent and carcass grading as did corn.

4. Hay millet and wheat both show a higher value than white corn when fed with bran and cane fodder.

5. Barley and milo are much inferior to the other three grains when fed with bran and cane fodder.

6. The difference is shown by a lower rate of gain, a higher cost of gain and less finish on the lambs.

7. Both the phosphorous and calcium carriers (bonemeal and lime) proved superior in the feed combinations of white corn, bran and cane fodder when fed in small quantities, over self-feeding and larger quantities as indicated in feed cost per cwt. gain.

8. Apparently through the feeding of greater amounts of both the lime
and bonemeal, a little more finish was obtained as indicated by the carcass grading.

9. Where either lime or bonemeal was self-fed the cost per cwt. of gain was higher and the carcass grading did not exceed either high or low level of force-feeding.

(Editor's Note: Detailed statistical summaries of these experiments may be secured from Colorado Experiment Station, Fort Collins.)

Off to an early start: Carl Nelson, left, and Oscar Gumeson, examine their perfect 1940 germination stand and decide to cross-block.

Why Two Men Like Cross-blocking

OSCAR W. GUMESON and Carl A. Nelson, operating the P. E. Hamm farm, Longmont district, are cross-blocking their beets again this year. On previous occasions they have credited cross-blocking with producing 2 to 3 tons more beets per acre than otherwise would have been harvested.

Cross-blocking, they point out, gives the beets a fast start, aids uniform spacing, and gives cultivation within the row not provided by other methods.

Mr. Gumeson says they roll their beets when they have four true leaves and follow immediately with their cultivator equipped for blocking. Cultivator knives or flat duckfeet are arranged so that they leave uniform blocks of beets with the centers ten inches apart. Then they reset their cultivator with knives and duckfeet and cultivate with the row before hand thinning begins.

Two years ago the plan of leaving cross-blocked beets having a narrow block without any hand thinning was tried out on this farm. Conditions again being equal, the cross-blocked beets having no hand thinning yielded two tons per acre less than those cross-blocked and hand-thinned.

—John Stewart.
A New Approach to Irrigation  
Investigation Being Made on Soils of 175 Fields

By ASA C. MAXSON  
Longmont Experiment Station

Faulty agricultural practices are often followed year after year because general conditions are so favorable that the ill effects of these practices are masked to the extent that they are not strikingly apparent.

Much of our irrigation practice is faulty. The dry period which has prevailed for several years has emphasized the magnitude of our errors and forcibly brought the need of better methods of handling water to our attention.

The proper use of irrigation water cannot be determined without a definite knowledge of certain fundamental facts concerning soil to be irrigated. In order to secure this fundamental knowledge, a detailed study of our soils is being conducted in cooperation with the Colorado State College at Fort Collins.

In this preliminary study the moisture equivalent and the wilting coefficient for the soil of 175 fields will be determined.

The moisture equivalent of a soil is a measure of the amount of water a soil can hold against the pull of gravity. This is determined by spinning a sample of soil, which has been saturated with water, in a centrifugal machine, which resembles a Babcock cream tester, until no more water can be removed. The amount of water remaining is figured in per cent of the weight of the soil air-dried.

The moisture equivalent or water-holding capacity varies with the type of soil. The sandy soils have a low water-holding capacity and the heavier loam and clay loams have relatively greater capacity for holding water. The relation of water-holding capacity to irrigation will be discussed later.

Plants cannot withdraw all of the water from a soil. When the water content is reduced to a certain point plants wilt permanently. The amount of water still remaining in the soil when permanent wilting takes place is called the wilting coefficient.

The wilting coefficient is not the same for all soils. Sandy soils give up their water more completely to plants than loams and clays. Therefore, sandy soils have lower wilting coefficients than loams or clays.

The wilting coefficient is determined by growing plants, usually sunflowers, in containers so constructed that moisture is lost from the soil only as it passes through the sunflower. All loss from the surface of the soil is prevented.

When the sunflowers have reached the required age, water is withheld until they wilt permanently. This permanent wilting is determined by placing the wilted plant in a chamber where the air...
THIRSTY SUNFLOWERS are telling the story of the permanent wilting point of various soils in this greenhouse test at Fort Collins. Robert Gardner, Associate Agronomist, Colorado Experiment Station, is holding a plant about to kick over in the tug-of-war between the plant pulling for moisture and the soil trying to hold it. Each can represents one of the 175 soils being tested.
is saturated with moisture. If the plant in question revives, it has not reached the point of permanent wilting and is allowed to grow longer in a normal atmosphere. If the sunflower fails to revive in the damp chamber, the point of permanent wilting has been reached.

The wilting coefficient is determined by drying the soil in which the sunflower grew and figuring the amount of water it contained when it wilted permanently in per cent of the dry soil. This per cent is the wilting coefficient.

NATURALLY the question as to how all this is applied to irrigation practice comes to the mind of the reader. This will now be explained.

The wilting coefficient gives us a measure for determining when water should be applied. For example, the soil of a certain field has a wilting coefficient of 8.0 which means that plants will wilt permanently when the soil contains 8.0% moisture or 8 pounds to each 100 pounds of dry soil.

Naturally, we do not want the soil moisture to reach this point. Let us assume that 12% moisture is the lowest point it can be safely allowed to reach. By keeping track of the movement of moisture in the field, we find that the soil has reached 12%. We know then that it is time to apply water. If a procedure of this kind is followed, we can apply water only when conditions are such that it should be applied.

After the need for irrigation has been determined, the proper quantity to apply is the next consideration. This is where the water-holding capacity comes into play.

We will illustrate by taking a soil with a water-holding capacity of 30% which means that each 100 pounds of dry soil will hold 30 pounds of water against the pull of gravity. If when this soil has reached a water content of 12% in the upper 4 feet, for example, and we want to raise it to 80% of its full water holding capacity, which is 24%, we must add 12% water to the soil. Now, we calculate what 12% of the soil in question is in acre inches and apply this amount to the soil.

This all sounds rather complicated, but it is not, once the water-holding capacity and wilting coefficient of a soil have been determined. To be sure, some means of measuring the water applied to the field will be necessary.

The saving of water which is now wasted by over-irrigation will be sufficient recompense for all work involved.
What Sugar Beets Mean to Larimer County

When you look at a map of Larimer county, Colorado, you are surprised to notice what a small part is under irrigation. And only 17 per cent of the irrigated land is in sugar beets. Yet sugar beets account for approximately 47 per cent of the total income from all irrigated crops in the county.

This fact and other interesting information about beets was presented at a graphic display at the Loveland Industrial Exposition and Spring Festival April 25 and 26. Hundreds were interested in the Golden Book which told the story of sugar beets.

One striking fact was this: "Loveland wants tourists because they bring $90,000 a year into the community. Loveland also wants beets because the beet business pays the community twelve times as much as the tourist business."

Fred Magnuson, Eaton grower, has cross-blocked his beets every year, excepting 1939, since 1930, and he informs us that cross-blocking will be practiced this year and in the future if germination stands will permit.

Five growers in the Gill, Colo., district are trying single seed planters this year. J. Fred Steck and J. A. Bardwell used a John Deere drill, with a 54-tooth plate, and G. N. Page, Jake Hergenreder and Tom Watt used a Case drill.

A nice job of ridge planting a 30-acre alkali seep field has been completed by Alex Schoenberg of Jessica station in the Sterling district. Preparatory to ridging, the ground was thoroughly worked down and leveled. The 40-inch ridges were formed with potato ditching shovels on the cultivator tool bar. The shoulders were flattened and firme by the use of an ordinary cog and corrugation land roller. Planting spacing was 16 and 24 inches.
C. M. BENEDICT of Selma dump, Sterling factory, has been doing a splendid job of irrigating up a 40-acre ridge planted field of beets. He finds he has better control of the water on his low, flat bottom soil by this method of planting and irrigating.

U. S. Ward, who delivers at the Pine Bluffs dump, Gering district, has always been a heavy user of phosphate. He has in the past applied it with his beet seed and also with a grain drill. This year he mixed it with the manure on the spreader and has plowed it under. He uses about 100 pounds per acre on his 95-acre contract.

Mr. and Mrs. H. G. Markham celebrated their golden wedding a few days ago. They have seen Northern Colorado develop from the prairie sod into a rich agricultural district. Mr. Markham started farming around Windsor at the beginning of the beet industry. He was one of the first growers to raise beets for the Loveland factory. Mr. Markham now has four good farms which are farmed by his sons and grandson. They always feed sheep and cattle and use beet by-products in the ration for a good gain at a low cost. Mr. Markham stated that he receives all the money for his farm income from three sources, namely, the Sugar Company, the Packing Company and the Kuner-Empson Company.

Paul Blood, Lyman territory, had all of his beets, 126 acres, planted by April 15. This acreage was all manured and phosphated.

Erik Bonde, 17-year-old son of Mr. and Mrs. K. Bonde, Longmont, won first prize for spelling in the three-state high school contest held at Greeley by Colorado State college. The prize, a 12-inch silver trophy, is now being displayed at the Longmont high school. Erik and his brother, Preben, have a 4-H beet club project, which from present looks should be in the winning class this fall.

Brethauer Brothers, the largest beet growers in the Kuner district, Greeley, this year, have 124 acres of beets planted on ridges. They have ridged their beets for the past three years with good success. They have found that in irrigating for germination and immediately before or after thinning, the beets on the ridges are not flooded and the soil is not crusted.

Gabe Lucas was the first man to start thinning beets in the Longmont district this year. He was on the job April 30. Mr. Lucas has a reputation for getting the jump on farm operations by planning ahead. Of late his farm work has been almost completely mechanized. He is equipped to do practically all jobs with tractor equipment. Regular feeding operations help maintain his soil fertility.

Gabe Was First!
Frank Bartels, right, shows the advantages of the pipe ditcher attachment in preparation for irrigating up.

Frank Bartels, owner and manager of a number of fine farms near Fort Collins, believes in irrigating beets up if rains do not come soon after planting and moisture is needed. He has cooperated with his tenants this year in providing special 5 in. pipe ditcher attachments for the beet cultivator to smooth out the irrigation furrows making the irrigation for germination faster, easier, and more economical in the avoidance of using any more water than necessary.

Nine new irrigation wells have been brought in this spring in the Eaton district.

Half of the acreage planted this season at Buchanan station in the North Sterling country has been phosphated. Among the heavy users of phosphate in this section are Herzog brothers, G. T. Matthews, George Hofmann, Jr., Johnny Nickal, and Jacob Sinner. This is generally a well-manured district; therefore, response from phosphate treatment should be most satisfactory.

Herman Gompert, Mitchell grower, who started the planting of 80 acres of beets March 20, commenced thinning the week of May 6.

A. W. Peterson has had the topography of his farm at Big Springs, Nebr., operated by August Borm, changed so much this spring that neighbors hardly recognize it. In addition to the leveling, a new well has been drilled and much waste land and hopper breeding grounds have been done away with by removing the fences and making new irrigation laterals. Pete says he likes to make improvements because both he and his tenant benefit financially.

The boys on the government farmsteads west of Scottsbluff have signed up 15 beet contracts this year. This is one of the Farm Security Administration projects.

A number of farmers in the Berthoud district were ready for cross-blocking this year. Results of past years show the advantages of cross-blocking, such as saving on irriga-
tion, quicker get-away and cutting out foul growth. George A. Kauffman, Dave Peterson, Roy A. Peterson, Ellis F. Cavender, P. D. Grommon and many others have practiced cross blocking for several years. Experienced beet labor prefers contracts where cross blocking is being done, they point out.

Even though it was necessary to haul the manure an average distance of 8 miles, Sam Nochi, Lyman territory, hauled enough to cover heavily 40 acres of beet ground.

Henry Gompert, Doyle, Nebr., grower, is off to a flying start with a good stand on his early planted beets making it possible to cross block according to his plans.

Early planting with favorable moisture conditions has resulted in good germination stands on a large acreage in the Ogallala, Sarben and Sutherland districts of Nebraska. This acreage will be ready for thinning all at once and many of the growers are making preparation for cross-blocking. Cross-blocking in 1939 proved to be very satisfactory. It resulted in better stands and higher tonnage. Other growers are now swinging towards this practice with the idea of assisting the labor in completing the thinning earlier, and as a result they expect increased yields.

A new well has been drilled on the Mrs. Caroline Haig farm at the Haig dump, Gering. The neighboring Duke land, farmed by John Stroh, also has brought in a successful well. These wells will insure an ample water supply this summer for these two farms.

Grand Lake diversion, long a cherished dream of the people of Northern and Eastern Colorado, is one step nearer realization with the commencement of actual work at the East Portal of the 13-mile diversion tunnel. The contract was let several days ago and machinery and men are now on the job, beginning the long tube that will change the whole irrigation situation in the greater part of the Colorado territory.

C. M. Bunning of Iliff, Sterling factory, did a fine job of packing his soil and eliminating all air pockets by discing with discs set straight and weighted down.

(Continued on Page 113)
Montana continues the March of Live Stock Progress. (1) Laurence Bauwens and his Hereford bulls sold at the Billings sale. (2) It looks like a good lamb crop for Joe Kuchinski, veteran Bridger beet grower and live stock operator. (3) These Yost brothers, Ishmael, known as "Babe," John and Leonard, with their father, Henry, and brother, J. George Yost, fattened 1585 head of cattle at Billings. "Babe" is a director of the Growers' association. (4) August Descheemaeker, with the top-selling Descheemaker and Croes bull in the sale.

**Billings Beet Growers Developing Purebred Herefords**

*By Jack Maynard*

Billings beet growers took a prominent part in the recent annual registered Hereford bull sale staged by the Billings Live Stock Commission Co.

There were 214 entries sold this year at this largest Montana sale for a total of $30,277 and of this number sold, the offering from beet growers totaled 41 head of outstanding individuals.

With an abundant supply of beet by-products, irrigated pastures and adjacent range land for low production costs, and with a strong market over the Montana and Wyoming range country for good breeding stock, these beet growers are finding this purebred venture profitable and are developing a reputation for outstanding seed stock.

The added advantage of a year-round production of barnyard manure fits in well with their general farming program.

The use of dried molasses beet pulp with grain in fitting bulls for the sale produced a bloom and finish that was reflected in the top prices received by the growers.

Descheemaeker and Croes of Fromberg have been using "Kinford Rupert 4th," a Bocaldo-bred bull of Hazlett breeding, to produce smooth, quick-maturing offspring. They sold 4 yearling bulls at an average of $214 and 6 bull calves at an average of $128. Last summer they purchased "Green Mt. Domino 18th," a blocky, thick-set calf at the Fred C. DeBerard dispersal sale at Kremmling, Colo., and are using this sire in their herd at present.
Richard and Oscar DeCock at Hysham have built up a fine purebred herd with blood from the famous A. B. Cook herd at Townsend, Montana. They sold 2 yearling bulls at an average of $190. W. M. Ferguson at Hysham also has a good herd of this breeding.

Laurence Bauwens of Fromberg sold 9 bull calves at an average of $130. His Hazlett-bred sire, "Kinford Rupert 3rd," is a massive deep-fleshed bull with wonderful loin and quarter development. Bauwens has a very good set of cows and is producing plenty of bone and substance in his calves.

Mark Timmons of Fromberg also secured a herd sire at the DeBerard dispersal sale, a good son of "WHR Royal Domino 45th," the bull that topped the sale at $5,125. Timmons sold 2 bull calves at $150 and $155. He has an exceptionally good group of cows and should develop some outstanding breeding prospects.

Leon Hendricks of Fromberg is using a Penn Randolph sire of Lester Thompson breeding, "Penn Mischief Domino," on Panama cows. He sold 7 bull calves at an average of $125. These calves were considerably under a year in age and of excellent quality.

Remy Berckmoes of Bridger sold 6 bull calves under a year at an average of $115. He is using Domino and Hazlett blood.

Nelson Brothers at Columbus sold 3 bulls at an average of $155. They are using Spidel bulls on Panama-bred cows. L. P. Joppa at Joliet sold 2 yearling bulls at an average of $150.

C. F. Kinmouth at Ballantine has an outstanding Hereford herd and has done much to improve the quality of the herds in this area through his importations of high quality sires from the east.

Beet growers who purchased bulls at the sale include D. C. Richards, Custer; F. C. Banderob, Billings; W. H. Coop and E. C. Hackney, Huntley; A. G. Taylor, Pompeys Pillar; Robert Lindgren and Nelson Brothers, Columbus; Conrad Oblander, Ballantine; J. J. Mills, Billings and John Mohr, Jr., Park City.

George Meyer of Waverly district, Fort Collins, is the tenant operator of a 282-acre farm of which 214 is crop land. In order to conserve irrigation water for his other cropped acreages, and to eradicate some infestation of bindweed, Mr. Meyer is summer following 50 acres of crop land with a field cultivator equipped with 10-inch duck feet. The landowner is cooperating with Meyer by furnishing the field cultivator being used.

Nebraska cattle sold at the Chicago stock yards May 1 for the highest price of the year, to date, when a drove of heavy weight steers from the Fred Attebery feedlots, Mitchell, Nebr., topped the trade at $13.10 per hundred. The bid was the highest made for a consignment of steers since May of last year. These, also, were
Attebery cattle. There were 18 head in the shipment and their average weight was 1,536 pounds each. They were all Herefords.

Three wells for irrigation water were dug this spring on the A. J. Smilie farm north of Hurick in the Windsor territory. The three holes were then connected to one electric pump. Mr. Smilie is now ready to deliver water in large quantities and on short notice for his tenant Harold Asmus.

Better land management for better farm returns is the rule of the Schlagels: Henry and Henry, Jr., left, cultivating beets, and Pete, right. Neat as their 520 acres of land is Henry's home, shown above.

Jacob Schlagel and his sons, Henry Schlagel and Pete H. Schlagel, in the Longmont district, are a father-and-sons group with a completely mechanized outfit. They have a large (Oliver) tractor for big and heavy jobs and a smaller one for drilling, cultivating, mowing, etc. This group, with one hired man handle most of the work on 520 acres. They have used their equipment to advantage at odd times in straightening the course of a meandering creek, grading down, filling old courses, grubbing out stumps and levelling down to bring under cultivation a considerable creek-bed area on their home place.

Henry is not losing sight of the fact that manure is essential to soil fertility and has either fed cattle or had feeding done for some years and is also building up a dairy herd.

R. A. Childs, near Henry, Nebr., started using turkey feathers as a fertilizer on his farm this year. He has covered several acres of land with the feathers which he received from the North Platte Valley Turkey Association located in Henry. Mr. Childs spread the feathers with a regular manure spreader followed by discing and later plowing.

E. A. Simpson, who farms at the Haig dump, Gering, is "sitting good" this year with his beet crop. He started planting March 30 and finished April 3. These beets were all planted on fall-plowed land. He had a fine stand as we went to press with prospects for another 20-ton crop.

An Eaton grower, who raises a large acreage of beets, only recently started to plant beets. He states that a good crop can be produced if planted any time the first half of May.

C. A. Hanlon of Mitchell territory is expecting even better results on his ridge planting this year with the more firm shoulders on the ridges holding plenty of moisture.

John Miller of Barnesville, Colo., who works his own beets, is cross-blocking his first planting as he knows the value of a uniform stand and the amount of labor saved by this method.

Ralph Campbell is building an all modern residence on his farm 3 1/2 miles east of Gering.
YOU are a beet grower and your sugar, Great Western Sugar, is the RIGHT sugar for your town and your community. The final net return for sugar sold is a vitally important factor in determining the price you receive for beets. If other sugar enters YOUR market, it means that your SUGAR must seek a market elsewhere, which reduces the return to the Company and to you. To sell more sugar nearer to the point of production is a common objective of farmer and Company alike!
# Table of Contents

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>You, Mr. Farmer</td>
<td>78</td>
</tr>
<tr>
<td>Why Youth Favors Beets</td>
<td>79</td>
</tr>
<tr>
<td>What Constitutes a Satisfactory Stand? Dr. H. E. Brewbaker</td>
<td>80</td>
</tr>
<tr>
<td>Farming Two Years in One</td>
<td>85</td>
</tr>
<tr>
<td>How Snow Surveys Are Made—R. L. Parshall</td>
<td>87</td>
</tr>
<tr>
<td>Colorado 4-H Boys Form Beet Clubs—C. W. Ferguson</td>
<td>89</td>
</tr>
<tr>
<td>4-H Sugar Beet Clubs in Western Nebraska</td>
<td>98</td>
</tr>
<tr>
<td>Four F. F. A. Beet Clubs in Lovell District</td>
<td>101</td>
</tr>
<tr>
<td>“C” Molasses With White Corn and Beet Tops Best in Lamb Test—Ivan Watson</td>
<td>103</td>
</tr>
<tr>
<td>Why Two Men Like Cross-blocking</td>
<td>104</td>
</tr>
<tr>
<td>A New Approach to Irrigation—Asa C. Maxson</td>
<td>105</td>
</tr>
<tr>
<td>What Sugar Beets Mean to Larimer County</td>
<td>108</td>
</tr>
<tr>
<td>Around the Territory</td>
<td>109</td>
</tr>
<tr>
<td>Billings Beet Growers Developing Purebred Herefords.</td>
<td>112</td>
</tr>
</tbody>
</table>

The Great Western Sugar Co., Longmont, Colo.
Through The Sheaves

The cover shows a farmer who has stacked his bundles of grain in straight rows to permit him to run a disk through the stubble before threshing.

Farmers have a good start on fall preparation of their land if grain is either stacked off the field or shocked in straight rows to permit disking. Manuring may be started before threshing, so that after threshing, the job of finishing the disking, spreading manure and plowing may be finished quickly, thereby taking advantage of what soil moisture remains in the surface.

Early disking has many advantages, including:

1. Cleaning up growing weeds, thus preventing further loss of water.
2. Mellowing the surface 3 to 5 inches.
3. Providing a loose surface which serves to connect the plowed soil to the unplowed subsoil.
4. Materially decreases the thickness and size of clods turned up later by the plow.
5. Decreases the draft on the plow.
6. Destroys insect pests and gives volunteer grain a chance to sprout and be killed later by plowing.
7. It gives a HEAD START on next year's work!
The Crop Today—And Tomorrow

The role to be played by sugar in the world crisis remains to be seen. Importance of sugar in past emergencies is well remembered. Sugar is essential to national defense. A well-functioning internal beet industry has increasing significance during troubled times. If off-shore areas are jeopardized, can America also be sure that sugar traffic with these areas can be securely maintained?

With an eye to the future, beet farmers have a two-fold present job:

1. To keep the crop growing and do their utmost to bring it to the highest yield conditions will permit, and
2. To take advantage of every opportunity to prepare beet land for 1941, under conditions where early preparation is desirable and practical.

Farmers have proved that they can do a good job of irrigating in years of limited water supply. Making available water go farther, by thrifty, resourceful, efficient work, has been done and is being done. Farmers deserve unmeasured praise for their ability to meet these situations.

The most successful growers endeavor to prevent wilting and suffering by timely light irrigations. They keep the crop growing and meet the future as the future meets them. In this issue is printed authoritative material on economical and efficient use of water. To be familiar with these principles is fundamental, whether a farmer’s supply of water is limited or abundant.

Many farmers are beginning in July with fall preparation of next year’s land. Fall preparation of most soil types gives more successful results than spring preparation. Light sandy soils that blow easily should not be worked in the fall. However, under most conditions, where the work can be properly done, fall preparation is the right practice.

In 1939 about one-fourth of all Great Western beets were grown on land where the entire contract was fall plowed. The average yield of these beets was 12.11 tons per acre compared with a Company average of 11.34 tons, showing that fall plowing was an influence favoring higher yields. Also, for the Company as a
whole, the stands were better on fall plowed ground, with 68 beets per 100 feet of row on the average, against 61 beets for the general average.

In certain districts the advantages of fall preparation were even more noticeable, notably northern Colorado, where fall plowed land exceeded the average yield by 1.25 tons per acre.

Colorado had 1,012 contracts entirely fall plowed, representing 36,998 acres or 31 per cent of the entire harvested acreage. Loveland and Longmont showed the highest number of contracts entirely fall plowed.

The Montana district showed 41 per cent of the harvested acreage on contracts entirely fall plowed, representing 517 contracts amounting to 15,372 acres.

In Nebraska only 2 per cent of the beet land was on contracts entirely fall plowed. This amounted to 1,020 acres on only 9 contracts.

The amount of land fall plowed in the various districts is influenced both by natural conditions and local custom. Northern Colorado for many years has been a locality where the type of soil and cropping systems have, on the whole, been favorable to fall plowing. Outstanding growers have made fall work a cardinal principle and one neighbor has benefitted by following the methods of another. Even in a dry year like last year, when many fields seemed too dry to work, farmers went to work with disks very early and found that early disking soon enabled fall preparation which otherwise might have been very difficult or impossible. Considerable grain is grown in this area, making stubble ground available for early work.

In the Montana district the soils are generally quite heavy, with much grain stubble available, and often if the soil is wet in the spring, it is very difficult or impossible to plow the land in good shape. Fall plowing has proved an advantageous practice, both from the standpoints of physical preparation and getting an early start.

A GRONOMISTS who have studied the Nebraska situation are of the opinion that in most years more land could and should be fall plowed. The fact that only 2 per cent of Nebraska acreage was entirely fall plowed last year, against 41 per cent in Montana and 31 per cent in Colorado raises interesting questions. It is recognized that Nebraska soils are generally lighter than in areas where more fall plowing is done. Where the soils are too light, with a good deal of wind, spring plowing is, of course, preferred. Moreover, in Nebraska most of the grain is seeded with a nurse crop, either alfalfa or sweet clover, making less stubble land available for fall plowing. However, in the North Platte Valley there is consider-
The difficulty of getting a good stand of beets on spring plowed land under the North Sterling with limited moisture has impressed growers considerably. The reaction in one instance was aptly expressed by Kenneth Rudolf, son of Joe Rudolf, who lives north of Crook, as he was plowing under a crop of sweet clover on June 11 for next year's beets, "I'll bet we don't have to irrigate beets up on this field next year."

able bottom land composed of heavy soil where more fall work could be done under favorable moisture conditions.

The many advantages of fall preparation are not realized, and actual disadvantages may ensue, if the job is not done right on the right kind of soil under right conditions. Fall plowed ground, left in the rough, is likely to be cloddy and hard after a dry winter. Following the plow, the soil should be harrowed, disked or rolled depending on its condition. When laid by for the winter, the surface should be, if possible, in such a condition that spring work would consist of a minimum of surface work, such as harrowing and leveling.

Properly done, fall preparation is a highly recommended practice because:

- It insures a better seed bed!
- It destroys weeds and pests!
- It conserves moisture!
- It enables fall manuring!
- It gives a better distribution of labor!
- It enables timely planting at the earliest favorable opportunity in the spring!

121
Making the best use of the available water supply is a vital problem confronting irrigation farmers during the present growing season. Every possible loss of water needs to be recognized and steps taken to prevent waste.

The loss of water caused by heavy irrigation is one not easily recognized and on some farms the loss from this source is excessive. Whenever water penetrates below the roots of the plants not only water is wasted but valuable plant food is leached out of the soil.

The soil acts as a reservoir in which water is stored between irrigations. This reservoir has a definite capacity for storing water the same as any storage system. The amount of water which should be applied at one time depends upon how much the soil will retain and make available for the growing crop.

It is obvious that a soil having a depth of three feet can hold and make available about half the amount of water which the same soil could hold if it were six feet in depth. With shallow soils which are underlaid with sand or gravel light irrigations should be used. If more water is applied than the soil will hold the extra amount drains into the coarse material. If the shallow soil is underlaid with hard pan or shale, heavy irrigations results in a water-logged condition unfavorable to plant growth.

Light sandy loam soils can store for plant use from $\frac{3}{4}$ to 1 inch of water for each foot depth of soil. With such soils needing irrigation to the depth of four feet, the amount of water applied should not exceed 4 inches. To soils of medium texture, from 1 to $1\frac{3}{4}$ inches depth of water may be added and held for each foot of soil. The amount of water applied to irrigate 4 feet of this type of soil should not exceed 6 inches total depth of water in a single irrigation. It is difficult because of slow penetration to get moisture deeper than 2 feet in heavy clay soils during a single irrigation without danger of drowning out the crop or scalding the roots in the upper 1 foot of soil.

After the first irrigation it is very seldom necessary to apply water to the soil deeper than three feet. Before any field is irrigated the sub-soil should be examined to see how deep it is necessary to apply water. (A soil auger or post hole digger should be used to examine fields before irrigation. Fields should be examined to a depth of 6 feet.) Many times when the crop shows the need for irrigation an examination of the subsoil shows abundant
moisture below the three-foot level. Consequently only enough water should be added to irrigate the part of the soil which is dry. More than this amount may cause either water logging or loss of water into the soil below the roots.

From experiments conducted by Leslie Bowen at the experiment station at Scottsbluff, Nebraska, it was found that sugar beets secured 80 per cent of the total water used from the upper two feet of soil; potatoes used 81%; oats used 80% and alfalfa used 61% of the total water used from the upper two feet of soil.

If the irrigator has dependable information concerning the capacity of the soil to retain water and if he knows how deep he needs to apply water he can apply this information to his irrigation practice. Suppose, for example, that he has a 20-acre field on which he has found that each foot of the soil will absorb and retain 1 inch of water (the equivalent of a 1-inch rainfall with no run off). An examination of the soil indicates sufficient moisture below three feet. To satisfy the moisture requirements then three inches of water should be applied (one inch for each foot) or 3 acre-inches per acre. A stream of 3 second-feet or 115 Colorado Miner’s inches running 1 hour will deliver enough water to cover 1 acre 3 inches deep, or in other words, 1 second-foot or 38.4 Colorado Miner’s inches will deliver 1 acre-inch in 1 hour.

If the irrigator were using a head of 3 second-feet he would clearly have to run the water for one hour for each acre or 20
SOIL DEPTHS FROM WHICH WATER IS TAKEN BY ALFALFA

Depth in Feet

<table>
<thead>
<tr>
<th>Depth</th>
<th>Water Taken (Per Cent)</th>
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<tbody>
<tr>
<td>1</td>
<td>48</td>
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<tr>
<td>2</td>
<td>15</td>
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<td>3</td>
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<td>5</td>
<td>8</td>
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<td>6</td>
<td>4</td>
</tr>
</tbody>
</table>

SOIL DEPTHS FROM WHICH WATER IS TAKEN BY POTATOES

Depth in Feet

1st. foot 57%
2nd. foot 23%
3rd. foot 13%
4th. foot 7%
hours for the 20-acre field to secure an average application of 3 inches of water. It is important to note that the time required as above given assumes that the water is spread uniformly over the land surface. This cannot be done if the field ditches are too far apart or if the irrigator does not give constant attention to his water. It cannot be done on land that is uneven and poorly prepared for irrigation.

**To determine in advance how much water to use** in the irrigation stream and the number of hours required to irrigate a given acreage with the stream, **forms a basis for measuring the degree of economy that is being obtained when the field is irrigated.** In the example quoted above 3 second-feet used on 20 acres for 20 hours may be the ideal. It may take 15 hours, 20 hours or 25 hours. As is often the case, if it takes 30, 40 or 60 hours, then something is wrong with the method of application. The water may be penetrating into the soil faster than it was assumed. The method of application may be changed by extra field ditches, shortening the distance the water is run over the land. With row crops one may irrigate every other row instead of every row or the furrows may be smoothed by use of a furrow smoother run behind the furrow openers. Rough uneven fields may be permanently improved by leveling before another crop is planted.

**The rules of a successful irrigator**

1. Get acquainted with the subsurface of your farm.
2. Grade the ground except where too close to sand and gravel or hardpan.
3. Replace plant food removed with the top soil by grading.
Ditching beets every other row with pipe ditcher attachments to avoid covering the young beets and to make possible the more economical and efficient use of water. The picture shows Carl Brunner, Drake station, Fort Collins.

4. Irrigate your crop—don’t drown it. Control the water flow—don’t leach or erode your soil.

5. Watch your soil. It is a reservoir for water and plant food. Guessing when it is empty, partly filled or running over will cut your yield. Keep the root zone moist—not soaking wet or almost dry. Eliminate the guesswork and use a moisture probe or soil auger.

6. Do not hesitate to experiment. Set aside a small plot and try different amounts of water on it. We learn by trial and error.

7. Don’t over-irrigate part of a field trying to get the other part wet. Use more cross ditches.

8. Measure the value of water by how much yield you lose if it is not available.

9. If water is valuable do not waste it. Have someone with it every hour of a 24-hour day.

Edward and Henry Senn, who farm east of the Loveland factory on the Greeley-Loveland road, have a top-notch beet prospect at this time on a field which looked very doubtful only a few weeks ago. Dry weather and a heavy growth of volunteer grain put the field in bad condition. The Senns cross-blocked this field and it was thinned by the George Zimmerman family. A light irrigation applied immediately after thinning started the beets off. Now the field is one of the best fields in a good neighborhood.
IN PRINCIPLE the growing of sugar beets does not differ greatly from the growing of live stock. In both there are certain fundamentals which must be followed if success is to be achieved.

At all times during the growth of a sugar beet or an animal the right kind of food in the proper quantity must be readily available to both, if proper development is to be made.

The first objective in sugar beet raising and feeder stock growing is the production of the framework. In the sugar beet this framework consists of leaves and root, and in the animal it is made up of body size.

Leaf and root development in the sugar beet and body size in the feeder animal must be accomplished before satisfactory finish can be secured. In the sugar beet this finish consists of stored sugar; and in the feeder animal a healthy development of fat constitutes finish.

If proper framework and finish are to be secured, the food requirements of the crop or animal must be understood.

Since plants secure much of their food dissolved in the soil water, feeding growing crops and watering are one and the same thing. This brings us to the point in question: Irrigating sugar beets.

FROM this point on, our discussion assumes that the soil in which our sugar beet crop is growing con-

---

Beets go down about 2 feet the first 47 days (by the middle of June on a timely crop) and during the first half of July they are down 3 to 4 feet, with the greatest mass of feeder roots in the upper 3 feet of soil.
tains all of the plant food required for the production of a satisfactory crop. This reduces our problem to one of the proper amount of water to apply and the proper timing of irrigation.

The important thing to keep in mind is that, regardless of the time of season and the age or size of sugar beets, whenever the soil moisture reaches a point where proper growth cannot take place, water should be applied.

In order to irrigate sugar beets properly a few fundamental facts must be kept in mind. One of these has just been mentioned. Root penetration at the time of irrigating is important. The water content of the soil at different levels should be considered also, as well as the water requirements of the crop.

As the root of the sugar beet penetrates downward the center of heaviest root development moves downward. At the age of 47 days the roots of the average sugar beet will have reached a depth of over 2 feet and the greatest root development will occupy the upper 18 inches of soil. For an average planting date this will be about June 15.

Three weeks later, July 6, this same beet will have reached a depth of between 3 and 4 feet with the greatest mass of feeder roots in the upper 2 feet of soil.

At the age of 130 days, about September 8, the roots of our beet will have reached a depth of over 6 feet with the greatest mass of feeder roots in the upper 3 feet of soil.

From the preceding it is seen that attention must be given to maintaining the moisture in the upper levels and that as the season advances, more attention should be given to the lower levels than earlier. At all times, however, the most important area of soil lies within the first 2 feet, since this carries most of available plant foods.

The volume of water to apply at any given time depends upon root penetration and the moisture at lower levels. Each irrigation should penetrate somewhat below the root penetration but not too far. This means that irrigation should become increasingly heavier, provided light early irrigations have been applied, as the season advances.

Should the moisture in the lower levels be sufficient, the irrigation should be gauged so as to wet down to this moist level only. Otherwise, water would be wasted, plant food would be leached out and the crop injured. Much of the objection to early irrigation is due to the improper application of early water.

The seasonal growth of the sugar beet has an influence on the water requirements. This point was the subject of study over a period of 10 years. The results are very interesting and instructive.

The weight of leaves increases up to about August 1, after which time their weight remains about the same or decreases slightly. Root weight is smaller than leaf weight up to about August 1st. From that time on, increase in root weight is more rapid.

One year with another, about 40 per cent of the tonnage delivered over the dump is actually produced during the month of August. During September about 18 per cent is produced, leaving about 42 per cent for the period from emergence to August 1st.
SINCE growth is associated with the amount of plant food consumed and the amount of food consumed is quite closely associated with the water consumed, it follows that the most important period from the standpoint of irrigation is from emergence to September 1 and that from August 1 to September 1 is a very important part of this period.

The preceding statement may be misleading unless care is taken in interpreting it. Reference has already been made to the framework of the sugar beet. That part of this framework which consists of leaves is normally produced prior to August 1st. The heavy August growth cannot be made unless the leaves have reached full development. This development cannot be made unless the crop receives sufficient water prior to August 1st.

Experience and study have taught us that if a crop must suffer from a lack of water the effect is less severe when this suffering occurs during the latter part of the growing season than when it takes place earlier.

Water saved for late application at the expense of early growth is poor water economy. Then, there is always the chance that the water shortage in the latter part of the growing season may not be as severe as anticipated.

**FIVE POINTS TO REMEMBER!**

1. Irrigate beets when they need water regardless of date, age or size.
2. Early irrigations should be lighter than later ones.
3. If the soil at lower levels contains enough water, apply only enough to wet down to this moist subsoil.
4. Keep the crop growing during the period prior to August 1st.
5. Give especial attention to watering during late July and August.

**Moisture Probe Is Cheap, Useful**

WHEN a farmer applies water by irrigation he should have some quick way of determining the amount of moisture in his soil.

A moisture probe is a simple tool that can be used when irrigating to find out where water has penetrated. It can keep the farmer in close touch with the moisture condition of his soil throughout the growing season.

The drawing herewith shows a moisture probe—a round steel rod 4 feet long and one-half inch in diameter, with a T-handle. The tip of the rod is blunted. You can make one like it for about 40 cents.
A profit of $6.77 per steer was estimated on this group fed corn, barley, soybean oil meal, wet pulp and alfalfa, compared with $3.73 downward on other lots. Part of the big crowd is shown, with Mr. Osland at the microphone and Lord Ogilvy, well known to all feeders, taking notes.

Proteins and Molasses Featured in Cattle Tests

Soybean Meal Shown Valuable at Fort Collins and Windsor Demonstration Shows Beet “C” Molasses More Desirable Than Cane.

By H. B. OSLAND
Head of Department of Animal Husbandry, Colorado State College

More than 400 farmers and ranchmen attended Cattle Feeders’ Day at Colorado State College May 24, and learned profit-making suggestions on handling standard rations. In the afternoon a demonstration at Windsor gave additional information, with particular interest centering on the desirability of using “C” molasses compared with cane molasses. Also at Windsor wet beet pulp proved a cheaper succulent roughage than corn silage.

In the Fort Collins experiment it was shown that protein supplements are essential to balance homegrown rations but since they are the most expensive part of the ration, the feeder must feed a minimum amount of the kind of supplement which will best fit into his feed combination.
### STEER FEEDING EXPERIMENT

Colorado Experiment Station, Fort Collins, Colorado

10 Steers per Lot—Fed 185 days—Nov. 14, 1939, to May 7, 1940

(Table based on one average steer)

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<th>Lot Number</th>
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<th>3</th>
<th>4</th>
<th>5</th>
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<th>7</th>
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<tr>
<td>Salt Self-Fed in All Lots.</td>
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<tr>
<td>Barley</td>
<td>Barley</td>
<td>S. B. O. Meal</td>
<td>Tankage</td>
<td>1 lb. Prot.</td>
<td>1 lb. Prot.</td>
<td>2 lb. Prot.</td>
<td>C. S. Cake</td>
<td>Wet Pulp</td>
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<tr>
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<td>Wet Pulp</td>
<td>Alfalfa</td>
<td>Wet Pulp</td>
<td>Wet Pulp</td>
<td>Wet Pulp</td>
<td>Wet Pulp</td>
<td>Alfalfa</td>
<td>Wet Pulp</td>
</tr>
</tbody>
</table>

| Initial Weight | 725.8 | 725.5 | 727.3 | 731.7 | 725.7 | 723.2 | 727.7 | 729.3 |
| Final Weight | 1146.2 | 1137.8 | 1128.7 | 1130.6 | 1134.2 | 1135.6 | 1130.2 | 1117.5 |
| **Total Gain** | 419.3 | 414.3 | 401.8 | 401.8 | 405.5 | 412.4 | 402.5 | 388.2 |
| **Daily Gain** | 2.27 | 2.24 | 2.17 | 2.17 | 2.19 | 2.23 | 2.18 | 2.10 |
| **Average Daily Ration:** | | | | | | | | |
| Ground Corn | 4.96 | 4.95 | 4.96 | 4.96 | 4.96 | 4.96 | 4.96 | 4.92 |
| Ground Barley | 4.96 | 4.95 | 4.96 | 4.93 | 4.96 | 4.96 | 4.96 | 4.92 |
| Cottonseed Cake | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 97 |
| Soybean Oil Meal | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 |
| Tankage | 18.69 | 18.69 | 18.69 | 19.00 | 19.00 | 18.80 | 18.80 | 18.90 |
| Wet Pulp | 7.58 | 7.92 | 8.05 | 7.06 | 7.36 | 7.81 | 7.91 | 8.61 |
| Alfalfa | 0.65 | 0.63 | 0.63 | 0.63 | 0.63 | 0.63 | 0.63 | 0.63 |
| **Potassium Iodide** | | | | | | | | 129* |
| Salt | | | | | | | | |

Feed Required per Cwt. Gain:

| Ground Corn | 219.0 | 221.0 | 225.0 | 240.0 | 225.5 | 261.3 | 183.4 | 234.3 |
| Ground Barley | 219.6 | 221.6 | 225.6 | 240.6 | 225.6 | 261.6 | 183.6 | 234.3 |
| Cottonseed Cake | 48.2 | 48.6 | 48.6 | 48.6 | 48.6 | 48.6 | 48.6 | 48.6 |
| Soybean Oil Meal | | | | | | | | |
| Tankage | 838.8 | 848.1 | 873.0 | 866.5 | 863.0 | 864.4 | 864.4 | 901.6 |
| Wet Pulp | 336.5 | 335.8 | 371.0 | 355.0 | 355.1 | 309.3 | 335.0 | 315.1 |
| Alfalfa | 2.3 | 1.4 | 1.5 | 1.6 | 1.6 | 1.7 | 2.1 | 2.5 |
| **Potassium Iodide** | | | | | | | | .901 |
| Salt | | | | | | | | |

Feed Cost per Cwt. Gain:

| 8.02 | 8.33 | 8.71 | 8.17 | 8.40 | 8.44 | 8.93 | 8.41 |

*mg
# FINANCIAL STATEMENT BASED ON ESTIMATED SALE OF STEERS, FORT COLLINS

(Table based on one average steer)

<table>
<thead>
<tr>
<th>Lot Number</th>
<th>RATION FED:</th>
<th>Cost per Steer in Feed Lot at $9.00 per Cwt.</th>
<th>Feed Cost per Steer</th>
<th>Est. Fixed Costs Including Int., Labor and Equipment</th>
<th>Est. Shipping and Selling Expense</th>
<th>Total Cost at Market (Denver)</th>
<th>Est. Selling Weight—Pounds</th>
<th>Valuation per Cwt. Flat (Denver)</th>
<th>Estimated Return Per Steer</th>
<th>Estimated Profit per Steer</th>
<th>Necessary Selling Price per Cwt. to Break Even</th>
<th>Margin Over Purchase Price Needed to Break Even</th>
<th>Feed Costs Used:</th>
<th>Cottonseed Cake</th>
<th>Soybean Oil Meal</th>
<th>Tankage</th>
<th>Alfalfa</th>
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<tr>
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<tr>
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<td>9.76</td>
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<td>69% protein</td>
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<td>9.75</td>
<td>9.75</td>
<td>1100.11</td>
<td>46.37 per ton</td>
<td>69% protein</td>
<td>35.10 per ton</td>
<td>67.50 per ton</td>
<td>10.00 per ton</td>
<td>2.52 per lb.</td>
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<tr>
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<td>69% protein</td>
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<td>9.76</td>
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<td>69% protein</td>
<td>35.10 per ton</td>
<td>67.50 per ton</td>
<td>10.00 per ton</td>
<td>2.52 per lb.</td>
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<tr>
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<td>9.76</td>
<td>9.76</td>
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<td>69% protein</td>
<td>35.10 per ton</td>
<td>67.50 per ton</td>
<td>10.00 per ton</td>
<td>2.52 per lb.</td>
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<tr>
<td></td>
<td>Alfalfa</td>
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<td>10.00</td>
<td>110.53</td>
<td>9.76</td>
<td>9.76</td>
<td>9.76</td>
<td>1096.32</td>
<td>46.37 per ton</td>
<td>69% protein</td>
<td>35.10 per ton</td>
<td>67.50 per ton</td>
<td>10.00 per ton</td>
<td>2.52 per lb.</td>
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<tr>
<td></td>
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<td>9.76</td>
<td>9.76</td>
<td>9.76</td>
<td>1096.32</td>
<td>46.37 per ton</td>
<td>69% protein</td>
<td>35.10 per ton</td>
<td>67.50 per ton</td>
<td>10.00 per ton</td>
<td>2.52 per lb.</td>
</tr>
</tbody>
</table>

Feed Costs Used:
- Gr. Corn: $23.40 per ton
- Gr. Barley: $22.80 per ton
- Protein Mix: $46.37 per ton
- Cottonseed Cake: $35.50 per ton
- Soybean Oil Meal: $35.10 per ton
- Tankage: $67.50 per ton
Above are some "C" Molasses steers at Windsor. Because of gains produced, cheapness of gain and finish, and the fact that "C" Molasses showed 88 per cent the feed value of cane, it proved more desirable. Below are Bill Farr, Harry Farr, H. B. Osland and George Kern.

The eighty head of yearlings purchased from the Linger Brothers in the San Luis Valley showed the following results after 185 day feeding period:

1. Expeller process soybean oil meal is just as palatable as cottonseed meal.

2. Even though the soybean oil meal does not show as high a feed replacement value as cottonseed cake, its ability to produce more bloom on the steers which apparently warrants a greater selling price, makes it a desirable substitute for cottonseed cake.

3. Tankage when used as the only source of protein is an unpalatable substitute and steers must be accustomed to it very very slowly.

4. Even though tankage produces good gain and finish, its cost increased cost of gain too much when compared to cottonseed cake.
## WINDSOR STEER FEEDING DEMONSTRATION

Colorado Experiment Station, Fort Collins, Colorado

17 Steers per Lot—Fed 192 days—Nov. 9, 1939, to May 20, 1940

(Table based on one average steer)

<table>
<thead>
<tr>
<th>Lot Number</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<td>Ration Fed.</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Salt and Min. Mix Self-fed in All Lots.</td>
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<td></td>
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<tr>
<td>Initial Weight</td>
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<td>713.5</td>
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<td>Final Weight</td>
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<tr>
<td>Total Gain</td>
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<td>Daily Gain</td>
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<td>2.35</td>
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### Average Daily Ration:

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<tbody>
<tr>
<td>Gr. Corn</td>
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<td>5.01</td>
<td>3.10</td>
<td>3.10</td>
<td>5.01</td>
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<td>Gr. Barley</td>
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<td>Cane Molasses</td>
<td>2.96</td>
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<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>&quot;C&quot; Molasses</td>
<td>2.96</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>C. S. Cake</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>X Commercial Pellets</td>
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<td>43.96</td>
<td>43.96</td>
<td>43.96</td>
<td>43.96</td>
</tr>
<tr>
<td>Wet Beet Pulp</td>
<td>9.27</td>
<td>9.00</td>
<td>10.50</td>
<td>11.86</td>
<td>7.54</td>
</tr>
<tr>
<td>Corn Silage</td>
<td>.52</td>
<td>.52</td>
<td>.52</td>
<td>.52</td>
<td>.52</td>
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<tr>
<td>Alfalfa</td>
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<td>.62</td>
<td>.62</td>
<td>.62</td>
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<tr>
<td>Mineral Mix</td>
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<td>.02</td>
<td>.02</td>
<td>.02</td>
<td>.02</td>
</tr>
<tr>
<td>Salt</td>
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<td>.02</td>
<td>.02</td>
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### Feed Required per Cwt. Gain:

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<th>4</th>
<th>5</th>
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</thead>
<tbody>
<tr>
<td>Gr. Corn</td>
<td>200.4</td>
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<tr>
<td>Gr. Barley</td>
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<td>141.5</td>
<td>94.6</td>
<td>92.2</td>
<td>143.8</td>
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<tr>
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<td>42.6</td>
<td>41.7</td>
<td>40.7</td>
<td>42.0</td>
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<tr>
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<td>42.6</td>
<td>41.7</td>
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<td>.85</td>
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<td>.42</td>
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<tr>
<td>Alfalfa</td>
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<td>.72</td>
<td>.32</td>
<td>.32</td>
<td>.42</td>
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<tr>
<td>Mineral Mix</td>
<td>.77</td>
<td>.72</td>
<td>.32</td>
<td>.32</td>
<td>.42</td>
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<tr>
<td>Salt</td>
<td></td>
<td></td>
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### Feed Cost per Cwt. Gain:

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<th>5</th>
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<tr>
<td>Corn</td>
<td>$7.87</td>
<td>$8.27</td>
<td>$8.22</td>
<td>$7.54</td>
<td>$10.04</td>
</tr>
</tbody>
</table>
FINANCIAL STATEMENT BASED ON ESTIMATED SALE OF STEERS, WINDSOR

(Table based on one average steer)

<table>
<thead>
<tr>
<th>Lot Number</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ration Fed.</td>
<td>Corn Barley</td>
<td>Corn Barley</td>
<td>Corn Barley</td>
<td>Corn Barley</td>
<td>Corn Barley</td>
</tr>
<tr>
<td>Cost per Steer in Feed Lot at $7.50 per Cwt.</td>
<td>54.07</td>
<td>54.23</td>
<td>54.12</td>
<td>54.23</td>
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</tr>
<tr>
<td>Feed Cost per Steer</td>
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<td>37.26</td>
<td>37.81</td>
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<td>Est. Fixed Costs Including Int., Labor and Equip.</td>
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<td>4.93</td>
<td>4.94</td>
<td>4.87</td>
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<td>Est. Shipping and Selling Expense</td>
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<td>2.50</td>
<td>2.50</td>
<td>2.50</td>
<td>2.50</td>
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<tr>
<td>Total Cost at Market (Denver)</td>
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<td>99.37</td>
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<td>Est. Return per Steer</td>
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<tr>
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<td>12.05</td>
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<tr>
<td>Necessary Selling Price per Cwt. to Break Even</td>
<td>8.77</td>
<td>8.94</td>
<td>8.92</td>
<td>8.63</td>
<td>9.89</td>
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<tr>
<td>Margin Over Purchase Price Needed to Break Even</td>
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<td>1.34</td>
<td>1.32</td>
<td>1.03</td>
<td>2.99</td>
</tr>
</tbody>
</table>

Feed Costs Used:
- Ground Corn: $27.00 per ton
- Ground Barley: $22.00 per ton
- Cane Molasses: $21.00 per ton
- "C" Molasses: 8.00 per ton
- Corn Silage: 6.00 per ton
- Cottonseed Cake: 40.00 per ton
- X Commercial Pellets: 38.00 per ton
- Wet Beet Pulp: .93 per ton
- Corn Silage: 6.00 per ton
- X Commercial Pellets: 38.00 per ton
- Mineral Mixture: 30.00 per ton
- Salt: 24.00 per ton
5. A protein mixture composed of one-third each of cottonseed meal, soybean oil meal and tankage made a good supplement when added to the standard ration of corn, barley, wet pulp and alfalfa hay.

6. The mixture did not show as high a feed replacement value as cottonseed cake, yet it produced more finish according to the appraisal and the steers demanded a higher selling price.

7. Feeding more than one-half pound protein supplement in a standard ration does not increase gain nor produce more finish but it does increase cost of gain. Apparently one-half pound of protein supplement is adequate for most economical gain.

8. Judging from this test, the recommended rate of feeding iodine is too high. More work is necessary to establish the correct level of iodine requirement in Colorado feed lots.

A COOPERATIVE cattle fattening demonstration between Harry Farr of Greeley, Geo. Kern of Windsor, the Great Western Sugar Company and the Colorado Experiment Station showed some very interesting results. Five lots of seventeen steers each were fed for 192 days at Windsor. A summary of the demonstration indicates results which should be of great value to our Colorado feeders.

1. X commercial pellets, a 16% protein-carrying supplement, was less valuable than cottonseed cake as a protein supplement in a standard fattening ration. They produced a lower rate of gain, more expensive gain, less finish and the steers showed a lower profit for the feeding operation.

2. Considering relative prices of the two kinds of molasses, beet molasses because of gains produced, cheapness of gain and finish, and the fact that it shows 88 per cent the feeding value of cane molasses, is the more desirable one to use in our standard fattening ration.

3. Wet beet pulp is a cheaper succulent roughage than corn silage. The difference between the two as shown in this report is probably unduly great because of the quality of silage used and because the final feed lot weights of these cattle was taken after the roughages had been fed.

R. S. Chesnut, Lowell Hoeft, Jake Stroh and S. P. Crowley are among those in the Milliken area who have put in irrigation wells this summer and have very good wells.

Mr. R. C. Benson, Loveland district, is well pleased with his summer feeding operations. He is finding a good market for part of the cattle which he is feeding on the place which have been marketed to date, and he is getting an exceptionally good gain, averaging around 2 pounds per day. He will probably be feeding yet for several weeks.
A SUCCESSFUL farming operation over a period of years is based on the following factors: intelligent management of the farm, maintaining the fertility of the soil, diversification of crops, and good cultural practices. J. P. Benzel, who farms south of Gering, Nebraska, on the F. M. Barney farm, has combined these factors with good results for himself as well as for his landlord.

There are three cash products sold from this 160-acre farm—sugar beets, potatoes and beef. Usually about 50 to 60 acres of beets are produced each year. The farming operation is built around the beet crop. Beets are the principal cash crop as they provide the most dependable income over a period of years, withstand hail and storms, fit in well with a crop rotation, and in addition to the cash return, supply a large amount of cattle feed in the form of beet tops. The growing of an acreage of beets of this size also makes available a supply of pulp for the feeding operation. About 20 to 25 acres of potatoes are grown. The potato crop diversifies the source of cash income as well as making an excellent profit in years when the market is good. The rest of the farm is planted to feed crops which are fed on the place.

The feeding operation is carried on over the entire year, during which time about 300 head of cattle are fattened in the yards. The purchasing of the feeders and marketing of the fat cattle extends over the 12-month period. Thus the chance of loss from sudden market fluctuations is greatly reduced and the feeding operation is kept on a much more stabilized basis.

When Mr. Benzel rented this farm nine years ago, it was in a low state of fertility. Today it is one of the highest producing farms in the North Platte valley. The cattle yards produce an ample supply of manure. Phosphate is applied to the beet land each year and a limited acreage of sweet clover is grown. This is plowed under for potatoes. The potato land is planted to beets the following year. The crops are always well cared for and what is also important is that Mr. Benzel arranges to get the work done when it should be done.

High yields of all crops are the result of Mr. Benzel's efforts. In the three-year period before he rented this farm an average of 28 acres of beets were produced, which yielded 11.95 tons per acre. During the past four years there has been an average of 58 acres of beets grown and the average yield over this period has been 18.02 tons per acre.—M. S. Clement.

Dr. R. D. George of Boulder, former state geologist, has been engaged to make a report on the possibilities of supplying pumped water to users under Milton lake, East Neres and the lower end of the Barr lake systems.
What the Irrigation Film Told You

A Digest of the Sound Motion Picture Summarizing Economical Use of Water.

THOUSANDS of farmers in Great Western territory have recently seen the sound motion picture, “Fundamentals of Irrigation,” photographed and edited by L. H. Mitchell, irrigation adviser, and released by the Bureau of Reclamation of the United States Department of the Interior.

We believe it will be of interest to review this film briefly as a reminder of some of the lessons learned. Where numbers are indicated in this text, will the reader please refer to the accompanying photographs.

Irrigation, the film explained, is the act of wetting land by causing water to flow over it by artificial means. For plants to grow and mature properly, the right amount of water should be applied to the soil. Water must be controlled. Water is delivered to farmers in rotation schedule or on demand. If on demand, the farmer gets his request card to give notice of the water wanted and the time he will start and finish irrigating.

The ditch-rider, photograph (2), tabulates these cards daily, and advises the water-master, who computes the quantity of water to be released from the reservoir or diverted from the river. The ditch-rider reports canal seepage, weeds, quantity of water diverted from one ditch to another, etc. The ditch-rider, photograph (3), is seen going to a turn-out to make a change. The farmer is on hand to receive the water. Water is a commodity, bought and sold. It’s wise, when buying anything, to watch the scales. The farmer checks the reading on his weir—a device for measuring water. He then diverts water from the head ditch to an equalizer, from which he leads the water to the furrows.

Must Know Root Habits of Plants

THE farmer must know the root habits of plants, and how deep the water should go. Soils differ also. Water penetrates some soils quickly, others slowly. Frequent changes in sets are made during the day. Watching water at night is important. A moisture probe is helpful in determining water penetration. Depth and type of soils vary often on a single farm.

Studying the root habits of plants shows many differences. Notice photograph (4). The roots of grasses and clovers are comparatively shallow—while sugar beet roots may extend into the soil 4 feet or more. The picture shows roots of strawberry clover and a sugar beet. Deep-rooted plants, like beets and alfalfa, naturally use much more water than most shallow-rooted plants.

It’s good to know what your neighbor is doing. At this point the motion picture shows farmers visiting each other’s farms and visiting experiment stations. Some farmers use the corrugation method. Corrugations extend down the line of the greatest slope; small and close together on steep land; larger and farther apart on flat land. Water not controlled, leaves eroded gullies below the plow slice; valuable plant food is washed away. Water must be divided into properly-sized streams, the film explains. Equalizers, parallel to the head ditch, divide water into properly sized streams. The equalizer is rarely more than 50 feet long, 4 feet wide and 1 to 2 feet deep.

139
Spiles May Be Used

Water goes from the head ditch to the equalizers, and from the equalizers to the furrows, often through spiles. Spiles may be sections of old cast-iron pipe, or air-brake hose, or wood or tar-paper. With spiles installed, 2 1/2 second feet of water is easily diverted into 240 small streams, with no waste of soil, plant food or water. Photographs (5) and (6) show a man distributing and placing 3-inch wooden spiles. Spiles made of lath will last longer than tar-paper, which only lasts a year or two as a rule. When spiles are placed just below the water surface, they divert the same amount of water to each furrow.

Water may be divided into streams by cutting holes in the banks. If the openings are carefully watched, water can be well controlled. At this point the film shows how to prevent erosion in the openings by riprapping with sod, weeds and discarded cement sacks; and next is shown how wooden chutes on a ridge permit irrigating both slopes at once. A hole in the side of the wooden head ditch gives a stream to each corrugation and a wooden gate is installed to regulate the size of the stream. Photograph (7) shows water coming out of a hole. On lands that erode easily, quick control of even a small stream is important. Metal slide gates are also used and a screen at the head of the wooden ditch prevents trash from choking the small gate openings.

Reel 1 ends with a presentation of bed irrigation for row crops on flat land, with listers making properly spaced furrows, throwing up dirt for the beds; also the border method is shown, to lead water over alfalfa and grain. Since no two farms are alike, the spacing of the dikes must be determined by the "cut and try" method. Rate of penetration must be studied.

Leveling Pays the Farmer

Reel (2) continues with the border method, with a demonstration of soil in glass tubes as shown in Photograph (8). Tube 2 is sandy loam. Tube 3 is fine sand. Tubes 4 and 5 contain clay soils. Water is poured into the tubes representing a continuous head similar to field irrigation. Water sinks rapidly into the fine sand in tube 3. It takes longer to penetrate the sandy loam in tube 2, and still longer to penetrate the clay soils in tubes 4 and 5. The test takes four hours. It takes 40 minutes for the last inch of water to disappear from the surface of the clay soils. They hold most of the water but some is released in down drainage. The down drainage wets 3 inches the first hour and 6 inches in 18 hours.

With the border method, rough and uneven ground gives uneven distribution of water. Low places become pools to drown or scald crops. The film shows alfalfa killed by standing too long in a low, wet place, and also shows alfalfa stunted from lack of moisture on the high dry spots.

See what happens in Photograph (9) where the ground is rough and uneven. The borders are 60 feet apart. Water stands on an uneven surface; there's too much in the low places, not enough in the high places. There is uneven penetration. The down drainage is less under the high spots than under the low ones.

That is why leveling is a capital investment. Photograph (10) shows leveling and smoothing the land with
ORDERED - 12 acre feet
2 second feet 3 days

USED - 8 acre feet
2 second feet 2 days

SAVED - 4 acre feet
a one-man leveler-float. Smoothing the land, each season if necessary, pays dividends. Notice the difference between photograph (11), where the ground is level and (9) where it is not. In (11) you see the surface of the border strip graded and smoothed, with the same texture soil and subsoil. The water is spreading down in an even sheet and sinks uniformly to the depth of plant roots. All the plants receive the same amount of water. They grow evenly and mature at the same time.

Capillary Action Shown By Film

The down-drainage is also uniform, with conditions shown in (11). The down drainage may be a few inches or several feet, depending on soil texture and depth of soil wet during irrigation. Four second feet is applied to about an acre of sandy loam, sloping 1 1/2 inches per 100 feet. In one hour the water spreads down the strip to within 200 feet of the end. The surface run-off from the upper end supplies ample water for the lower 200 feet. The 4 acre inches penetrate 3 feet. Three feet might not be enough for alfalfa if you didn't know the underground moisture condition. The upper layers were deficient in available moisture but the subsoil was wet from a high water table. Photograph (12) shows a cross section of soil, showing wet soil at the bottom of the pit caused by capillary action from the water table underneath.

The film now shows capillary action of water moving upward from the subsoil, illustrating what happens with different kinds of soil, with and without free water. A high water table implies free water. Water rises faster in the clay soils than in the sandy soils. In a clay soil it may rise 17 inches in 4 days. In a field with a high water table, water may move up in clay soils 6 or 7 feet. It is important for the farmer to be well acquainted with the subsoil movements of water on his land.

Shorter Runs Are Best

The film now shows a farmer trying different runs to learn which length gives best results. He tried 80 rods and 40 rods. The tract with the 40-rod run used 11 acre-inches less water and produced 8 bushels more corn per acre than the 80-rod run.

When a run is too long you waste water. Suppose you want 4-foot penetration at the lower end of a long run. Water at the upper end may go down 8 feet. Water available in the 4-foot zone may be used by the plants. Water below the 4-foot zone, out of plant reach, is water wasted. By putting in a cross ditch, the water reaches 4 feet at the lower end and is only 5 1/2 feet down at the upper. Little water gets away. Photograph (13) shows water used, water wasted and water saved. Over the entire field there is ample and uniform penetration of water for plant roots, but the water wasted is much less, thus proving that properly spaced cross-ditches prevent marked inequality of penetration and save water. This ends reel 2.

Reel 3 begins with showing how excessive penetration contributes to seepage. Excess water on the lower soil layers travels through the sand and gravel along the hardpan seeking an outlet. Not finding an outlet, it keeps on traveling. Even after the water is turned off, as shown in photograph (14), the down-drainage from
the porous soil at the upper end is forcing the water at the lower end to move on.

Tight soil is encountered. Horizontal movement of water is retarded. Water is dammed by the tight soil and gradually forced up through the clay to the surface, or near the surface, where, as free water, capillary action takes it to the surface. Alkali in the soil layers is brought to the surface. The surface water evaporates but the alkali stays in the upper soil layers.

Seeped lands require a second re-claiming. See photograph (15). Ditches must be dug to drain the soil. If the soil is tight, the ditch is left open. But if the soil contains porous material, tile drains are sometimes used. Prevention costs less than cure. Drains are expensive to construct and maintain. Had the upper field with porous soil been irrigated independently of the lower field, and had the porous soil received more frequent and lighter irrigations than the clay soil, the waterlogging of the land and the accumulation of alkali would have been reduced, if not prevented. Drains are effective in removing excess water from the soil, but the alkali accumulated on or near the surface must be removed by irrigation.

Tubes And Probes Are Helpful

To determine when to irrigate, a farmer may use a soil auger or a soil-sampling tube to bring up a core of soil. A steel tube 1 inch in diameter and about 5 feet long, as shown in photograph (16), can be driven into the soil and pulled out with a home-made jack. The core of soil that slides out of the upper end of the tube is used for soil moisture determination. Compressing soil in the hand is better than guessing.

And to determine water penetration during or shortly after irrigation, a farmer may use a moisture probe. A round probe made from a half-inch steel rod 4 feet long with a handle makes a fine probe. The probe can be pushed into wet soil, but not into dry soil. The first few times the probe is used, a test hole is dug. That portion of the probe in wet soil is pulled out and placed in the hole to compare the findings. The probe shows how quickly water is moving sidewise and how deeply it is penetrating.

The probe helps the farmer estimate how much water he needs. The film gives an illustration. Calling his ditch-rider, the farmer advises that he ordered 2 second feet of water for three days to irrigate his 24 acres of beans, but by using a moisture probe and irrigating nights he can finish in two days. He would like to have his water shut off in the morning. The ditch-rider cooperates. The farmer makes out a corrected card. See photograph (17). The farmer ordered 12 acre feet, used only 8, and saved 4.

Closing the turnout and regulating the water, (Photograph 18), the ditch-rider looks forward to the time when other farmers will follow this farmer's example—using water economically, preventing seepage, conserving plant food, and producing finer crops!

The results of good farming practices are well shown on the Louis D. Abrams farm south of Loveland. Mr. Abrams harvested a fairly good pea crop and immediately disked it in order to conserve the moisture. This field will be prepared for beets this fall for 1941.
Placing his 38th beet crop on the same farm, O. W. Anderson (center) is using a beet drill including parts of the same drill he used when planting his first crop in 1902. With him are two of his sons, Carl, left, and Edwin.

This One-Year Lease Has Lasted Forty-five

FORTY-FIVE years ago—December 15, 1895—O. W. Anderson moved to the farm of S. B. Harter five miles southeast of Loveland. Landlord and tenant signed a lease for one year.

At the end of the year, it looked as if wild oats was going to ruin the place. Should they go on with a farming operation? They talked it over. No lease was signed, but Mr. Anderson remembers the conversation.

"If I don't want you on this farm any longer, I'll tell you so," said Mr. Harter, and added, "If you don't want to stay on the farm any longer, you tell me so."

Mr. Anderson has been there ever since. The farm is now owned by Mrs. E. W. Borland.

The first few years were not easy. The Loveland sugar factory did not operate until 1901, and Mr. Anderson is one who can tell by personal experience what the coming of sugar beets did for his particular farming job—a story which could be repeated on hundreds of northern Colorado farms.

He grew his first beet crop in 1902 and has grown beets every year since with the exception of 1921. He grows 25 to 30 acres annually, averaging 14 to 14⅔ tons per acre over 37 years. The farm was originally purchased for $4,000 and is now one of the outstanding farms in a high-producing community.

But before the beet crop came in, things were different. Mr. Anderson states that his wheat crop tared
about 50 per cent wild oats. Today, thanks to the clean cultivation of beets in the rotation, the place is free from foul growth of any kind.

“The coming of the beet crop to the Loveland territory was the best thing that happened to this farming area,” Mr. Anderson stated. And it wasn’t beets alone, because beet byproducts soon helped to create a market for other crops.

“The first year the beet business came into this section, it raised the price of hay from $2.00 to $8.00 a ton. There was no feeding industry to speak of in northern Colorado prior to the coming of the beet industry, and availability of beet by-products made a much better market for all feed crops than had previously existed,” he said.

BEETS made other differences. Loveland in 1900 had a population of 1,091 people. When Mr. Anderson started farming there were only three grocery stores, two blacksmith shops and a few other miscellaneous stores. Inside of three years after the factory had started operation, one would not recognize it as the same town. He could remember when farmers worked Sundays on the roads so they could haul beets during the weeks. Today the highways are excellent and the city of Loveland numbers 6,032 people.

Living on the same farm 45 years, Mr. Anderson has raised a family of four sons and one daughter. His son, Harold, helps his father on the home place. His son, Edwin G. Anderson is renting the Sophie Swanson place two miles east of Campion, a farm that hasn’t grown beets since 1917, showing that Edwin also realizes the importance of sugar beets in undertaking a farm rotation. Mr. Anderson’s son, Carl, works for Larimer county and his son, Adolph, is working for another grower in the Loveland district. Ida, the daughter, lives at home with her father.

Mr. Anderson has been a consistent cattle feeder for many years. His place is an example of neatness and efficiency and he ranks as an outstanding citizen in the community.

**Averaged 17 Tons Per Acre for 30 Years**

A REMARKABLE and outstanding record is the beet raising history of Harry Crabill of Melbeta, Nebr. In 1910 Harry started raising beets with his father, G. M. Crabill. From 1910 to 1914 the contract was in the name of G. M. Crabill. For one year in 1914 the contract was in the name of Crabill Bros. From 1915 to date Harry Crabill signed the contract.

This covers a thirty year period in which Mr. Crabill raised beets every year. The average yield over this thirty-year period is 17.0 tons, which is remarkably high. In figuring the average we also had to include a few bad years such as 1933 when the low yield was caused by severe hail and not through negligent farming. The average tonnage for the four year period, 1935, 1936, 1937 and 1938 was over 20 tons.

Mr. Crabill supplements his beet raising by feeding sheep each year. He includes beet tops as part of his regular rations. Mr. Crabill also believes in early seed bed preparation and early planting. We believe that for the Nebraska district, Mr. Crabill’s record is hard to beat.

—A. E. Heldt.
Fall Plowing Pays Dividends at Loveland

By J. L. WILLIAMS

Out of 540 growers raising beets in the Loveland district in 1939 there were 249 who had their entire contract fall plowed. The average tonnage for the Loveland district was 11.97 tons per acre. Where the land on a contract was all fall plowed, (and there were 4,706 acres where the entire beet acreage was fall plowed) the average yield was 13.83 tons per acre, or practically 2 tons above the district average.

On 2,099 acres where all of the beet ground on the contract was spring plowed, the average tons per acre here was only 8.78 tons, or practically 3 tons less than the district average and 5 tons less per acre than where the land was fall plowed. Where part of the contract was spring plowed and part was fall plowed, (2,205 acres) the average tonnage on this land was 11 tons per acre.

There were 9,010 acres of beets in the Loveland district in 1939 and of this 6,032 acres were fall plowed, or practically two-thirds of the acreage. In going over the list of yields obtained by the growers in the territory, we find some very striking results of the advantages of fall plowing. In making a study of this, I first went through the list and picked out the growers at each station who had an average yield of 17 tons per acre or more and I find that out of 51 growers who had this kind of a yield there were only four growers who did not have all of their beet land fall plowed, and there was only one grower out of this entire list whose land was all spring plowed. The following growers are the exceptions to the list and the only ones out of the 51 whose land was not all fall plowed:

Fred Huwa, Johnstown.................. Had 35.9 acres fall plowed out of 60.7
Oliver Lee, Berthoud.................. Had 8.2 acres fall plowed out of 11.2
Alex Schneider, Campion.............. Had 6.3 acres fall plowed out of 10.2
W. A. Frazier, Fife............... Had 11.82 acres, all of which was spring plowed

The following list shows by stations the growers who had over 17 tons per acre, giving the acres harvested, tons per acre and per cent stand:

<table>
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<tr>
<th>Name of Grower</th>
<th>Acres Harvested</th>
<th>Tons Per Acre</th>
<th>Per Cent Stand</th>
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Through the Leaves

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<th>Per Cent Stand</th>
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<td>Ihnen, Chris</td>
<td>7.87</td>
<td>18.27</td>
<td>76</td>
</tr>
<tr>
<td>Campion Station Schneider, Alex</td>
<td>10.15</td>
<td>17.60</td>
<td>86</td>
</tr>
</tbody>
</table>

Looking over this list, it is not only noticeable that these growers had, in general, an average-sized acreage, but it is also quite noticeable that the per cent stand of individual growers is considerably above the average per cent stand for the district, which was 73 per cent in 1939.

There were several instances during the fall of 1939 where fall plowing was done under what appeared to be extremely poor conditions and the land plowed up very rough. However, where growers worked this land down when it was dry in the fall by floating or rolling it, winter moisture that they received allowed them to get in early this spring and, as a result, they were able to prepare good seed beds and get their beets planted early. Beet growth on properly handled fall plowed ground has been noticeable to date this year.

Retail Prices Today Compared to the “Gay Nineties”

 Average Retail Price in United States

<table>
<thead>
<tr>
<th>Item</th>
<th>1891 to 1900</th>
<th>1929 to 1938</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refined sugar per pound</td>
<td>$0.0574</td>
<td>$0.0561</td>
</tr>
<tr>
<td>Butter per pound</td>
<td>$0.2575</td>
<td>$0.3759</td>
</tr>
<tr>
<td>Lard per pound</td>
<td>$0.0953</td>
<td>$0.1432</td>
</tr>
<tr>
<td>Flour per 1/4th Barrel</td>
<td>$0.6382</td>
<td>$1.0782</td>
</tr>
<tr>
<td>Potatoes per peck</td>
<td>$0.2229</td>
<td>$0.3825</td>
</tr>
<tr>
<td>Milk per quart</td>
<td>$0.0677</td>
<td>$0.1217</td>
</tr>
<tr>
<td>Eggs per dozen</td>
<td>$0.2067</td>
<td>$0.3727</td>
</tr>
<tr>
<td>Hens per pound</td>
<td>$0.1831</td>
<td>$0.3128</td>
</tr>
<tr>
<td>Corn meal per pound</td>
<td>$0.0190</td>
<td>$0.0468</td>
</tr>
<tr>
<td>Bacon per pound</td>
<td>$0.1323</td>
<td>$0.3597</td>
</tr>
<tr>
<td>Pork chops per pound</td>
<td>$0.1115</td>
<td>$0.3083</td>
</tr>
<tr>
<td>Round steak per pound</td>
<td>$0.1254</td>
<td>$0.3519</td>
</tr>
<tr>
<td>Ham per pound</td>
<td>$0.1549</td>
<td>$0.4550</td>
</tr>
</tbody>
</table>

Decrease of 2.26%           |
Increase of 45.98%          |
Increase of 50.26%          |
Increase of 68.94%          |
Increase of 71.60%          |
Increase of 79.76%          |
Increase of 80.31%          |
Increase of 135.01%         |
Increase of 146.32%         |
Increase of 171.88%         |
Increase of 176.50%         |
Increase of 180.62%         |
Increase of 183.74%         |

---Sugar Beet Journal.

149
A RATION of Dried Molasses Beet Pulp, mixed (equal parts by weight) with plump Montana oats and supplied in self feeders to fattening lambs, with long alfalfa hay on the side, has produced consistently the heaviest gains and highest net returns in lamb feeding experiments conducted during the past 5 years by the Montana experiment station.

The remarkable record of this self fed mixture of Dried Molasses Beet Pulp and Oats is indicated by the table included here which summarizes detailed results secured during the 5 separate feeding trials.

### Daily Ration Fed (lbs.)

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dried Molasses Beet Pulp</td>
<td>1.30</td>
<td>1.31</td>
<td>1.43</td>
<td>1.35</td>
<td>1.11</td>
<td>1.30</td>
</tr>
<tr>
<td>Whole Oats</td>
<td>1.30</td>
<td>1.31</td>
<td>1.43</td>
<td>1.35</td>
<td>1.11</td>
<td>1.30</td>
</tr>
<tr>
<td>Alfalfa Hay</td>
<td>1.06</td>
<td>1.16</td>
<td>1.28</td>
<td>1.51</td>
<td>1.01</td>
<td>1.26</td>
</tr>
<tr>
<td>No. Days on Feed</td>
<td>98</td>
<td>62</td>
<td>60</td>
<td>60</td>
<td>74</td>
<td>65</td>
</tr>
</tbody>
</table>

### Weight of Lambs

<table>
<thead>
<tr>
<th></th>
<th>Initial Weight</th>
<th>Final Feed Lot Weight</th>
<th>Feed Lot Gain per Head</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>81.1</td>
<td>105.4</td>
<td>26.9</td>
</tr>
</tbody>
</table>

### Avg. Daily Gain per Head (lbs.)

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>At Feed Lot</td>
<td>.430</td>
<td>.432</td>
<td>.531</td>
<td>.538</td>
<td>.460</td>
<td>.475</td>
</tr>
<tr>
<td>With Est. 6% Shrink to Mkt.</td>
<td>.34</td>
<td>.33</td>
<td>.43</td>
<td>.44</td>
<td>.37</td>
<td>.392</td>
</tr>
</tbody>
</table>

### Feed Per Cwt. Gain (Feedlot)

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dried Molasses Beet Pulp</td>
<td>300.9</td>
<td>303.3</td>
<td>269.3</td>
<td>250.7</td>
<td>246.6</td>
<td>254.2</td>
</tr>
<tr>
<td>Whole Oats</td>
<td>300.9</td>
<td>303.3</td>
<td>269.3</td>
<td>250.7</td>
<td>246.6</td>
<td>254.2</td>
</tr>
<tr>
<td>Alfalfa Hay</td>
<td>253.7</td>
<td>267.9</td>
<td>241.1</td>
<td>335.7</td>
<td>224.4</td>
<td>264.6</td>
</tr>
</tbody>
</table>

### Feed Cost Per Cwt. Gain

<table>
<thead>
<tr>
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<th></th>
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</thead>
<tbody>
<tr>
<td>$8.28</td>
<td>$10.27</td>
<td>$6.31</td>
<td>$5.34</td>
<td>$4.68</td>
<td>$6.96</td>
<td></td>
</tr>
</tbody>
</table>

Average ton cost of Feed, Dried Molasses Beet Pulp $18.90; Oats $23; Alfalfa $6.40.

A SURVEY of the above figures shows the unusual uniformity of results secured with this ration.

The figures indicate that on the average a 30.8 lbs. gain at the feed lot or a 24.8 lbs. gain at market was secured in 65 days with 68 lbs. dried molasses beet pulp, 68 lbs. oats and 65.6 lbs. alfalfa. In other words the amount of feed required to fatten 1000 lambs would be 34 tons dried pulp, 34 tons oats and only 32.8 tons alfalfa.

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ON THE OPPOSITE PAGE.

1. Lamb feeding experiment at Huntley Field Station where Montana Experiment Station secured conclusive results with self-fed ration of Dried Molasses Beet Pulp and Oats. In 5 tests this ration "led the field" in combined gain and economy of production.

2. Mackey Sheep Co. feed lots at Mossmain, near Billings, where 12,000 to 15,000 lambs are fattened annually on self-fed ration of Dried Molasses Beet Pulp and Oats with alfalfa hay.

3. Feed lot of Moran and Fahrenbruck at Fromberg. These lambs pastured on tops returned $1.20 for tops per ton of beets and were then finished on self-fed mixture of Dried Molasses Beet Pulp and Barley with Alfalfa.

In these tests lambs have been put on full feed in a very short time, usually within a week or ten days from the time they were put on feed. The use of dried molasses beet pulp has eliminated indigestion and bloat and as the figures indicate, maximum gains have been secured from the start.

While this ration is particularly well adapted for commercial feeding where a quick heavy finish is desired with a minimum amount of roughage, it is also valuable for use by the average beet grower in finishing off the heavy, growthy end of his lambs quickly and before they make excessive growth that may be penalized. In such cases self-feeders can be used to advantage for the top deck or carload while the balance of the lambs or smaller end are putting on cheap gains with beet tops, alfalfa and a limited grain feed. Then, after the first load has been shipped to an early market, the larger end of the remaining lambs can be transferred to the self-feeders and this process followed out to insure a uniform weight and finish throughout. In this manner it will be possible to produce "trademark" lambs that should all command a premium on the market.

Morgan Man Makes Water-Saving Test

JA C K Ott, young Fort Morgan farmer, has worked out an irrigation plan with Floyd Brown of the Colorado State College Extension Service to make the best possible use of his limited amount of water.

He has 156 acres of crops and only 132 acre-feet of water. Fortunately he may use water at any time in any amount. His plan provides that no water will be allowed to run off a field. Thirty-two acres of alfalfa will be irrigated once—after the first cutting—with 4 second-feet of water for 48 hours. This is enough water to cover the field to an average depth of 6 inches.

Fourteen acres of barley with a fine stand of new alfalfa seeded with it will be watered three times. With a 4-second-feet head he can get the field irrigated in 14 hours and apply 4 inches of water. Twenty acres of barley planted with sweet clover will get two irrigations of 4 acre-inches each time.

Twenty acres of corn will get two irrigations of 5 acre-inches each; 20 acres of sugar beets will be irrigated 4 times with 5 acre-inches each time; 20 acres of beans will be watered 3 times with 3 acre-inches each time. There will be no water for sorghum because, with the irrigations as planned, 126 acre-feet of the 132 acre-feet available will have been used. The 6 acre-feet left over may be used on the alfalfa if they are not lost by evaporation and seepage from the ditches.

Brown believes Ott will get two cuttings of alfalfa, a good yield of barley, beans and beets with enough corn to fill his silo and a stand of alfalfa brought through alive. Better yields could be expected with more water, he adds, but careful irrigation should more than repay Ott for his efforts.
From Section Hand to Half Section Owner

By J. L. WILLIAMS

ABOUT three miles east of Loveland on the First Street road you come upon an outstanding farm home. This is the home of Mr. and Mrs. Henry Stroh and adjoining it on the east is the beautiful farm home of Mr. and Mrs. Harry Stroh.

Mr. and Mrs. Henry Stroh moved to their present location in 1916, where they have raised a family consisting of Carolyn Stroh, who lives with them on the farm; a son, Harry, who lives in the adjoining house on this farm; J. J. Stroh, owner and operator of Sunset Sales Yards at Greeley; John J. Stroh, chief of police at Torrance, California, and two other daughters, Mrs. Charles Showalter of Downey, California, and Mrs. Carl Hoff of Loveland.

In talking with Mr. Stroh in regard to his past history and how the present farm has been developed, we get a very interesting story. Mr. and Mrs. Stroh came to Lincoln, Nebraska, from Frank, Russia, on February 2, 1892. He worked first in a stove factory at Lincoln for two months at 50c per day for a 10-hour day. Then they moved to Stratton, Nebraska, where he got a job as a section hand. He worked at this job, receiving $1.12 per day, working 10 hours a day, continuing in this position for 18 months, at which time he was transferred to Trenton, Nebraska, as section foreman, where he received $50 per month.

The family moved to Loveland April 1, 1904, and started farming on one of the D. T. Pulliam farms, six miles southeast of Loveland. He raised his first beet crop on this farm, averaging 20 tons per acre and he stated that that beet crop had been hailed quite badly. This was his first experience in the beet business. After farming this place one year, the family moved to one of the Buckingham places southwest of Loveland, where they farmed one year.

They moved from here the following year to one of the Hamilton places, now being farmed by Howard Erwin, where they continued to farm the next three years. Mr. Stroh stated that on this place he had his first experience in fall plowing in preparing for beets and the results that he obtained convinced him that fall plowing was one of the necessary practices to carry on in order to produce a good beet crop. From here the family moved to a farm on the Weld County line, five miles east of Loveland, the place now being farmed by Carl Amen. They farmed on this place for eight years and during one of these years had a 14-acre beet crop that averaged 26 tons per acre.

BY THIS time Mr. Stroh decided that, if he wanted to get ahead in farming, it was advisable to farm his own place rather than continue to pay rent. In 1916 he bought the 80 acres of land directly north of his house from Henry Albert for $12,500. This land was formerly school land. The following year he bought the 80, where his present home is now located, from the State Land Board for $30 per acre. This is the land on which all of the buildings on the place are located and the picture shows Mr. Stroh in the beet field located in the northeast corner of this particular piece of land. This field, by the way, was fall plowed in 1939 and has all indications of making an excellent crop.
Realizing the benefits of the present and building for the future! Henry Stroh on a fall plowed, early planted field; (2) the Stroh home and gardens and (3) how the garden looks through the wide window; (4) the beautiful sunken gardens in what was formerly an unsightly seep hole at the home of Harry Stroh and (5) Margaret at the outdoor fireplace; (6) part of the purebred Holstein dairy herd on Henry Stroh’s farm.

In 1918 he bought two more 80-acre tracts adjoining the home place at $30 per acre. He now owns a total of 320 acres of land. Of this 320 acres, 110 acres is crop land and approximately 220 is pasture. During the past 10 years, Mr. Stroh has averaged 30 acres of beets on his crop land with an average tonnage of approximately 15½ tons per acre for the 10-year period. He is raising 26 acres of beets this year.

Asking Mr. Stroh what he considered some of the principles of good farming, he enumerated them as follows:
Fighting Weeds With Fire

By O. E. FRISBIE

Fighting weeds in Wyoming! (1) A. B. Elledge demonstrates the hand pump weed burner; (2) shows the horse-drawn adjustable wheel rig with engine and pump; and (3) shows the Meyers pump and Hardie sprayer operating two burners at 150 pounds pressure burning white top.

Under the leading attack of Clyde Corkins, Wyoming State Entomologist, and A. B. Elledge, Park County Pest Inspector, a very successful handling of obnoxious weeds is being conducted. Three types of weed burning equipment are shown in the accompanying photographs. This same equipment is also used in applying chemicals, such as chlorate and Atlascide.

Photo No. 1 shows a very good example of what can be done on the farm in building a barrel weed burner. This is capable of producing about 120 pounds of pressure, and through the use of a novel device for generating, the flame is kept going, which is not the case with a great many small weed burners now in use.

A ¾” conduit 12 feet long is bent into shape as shown by Mr. Elledge in the photo. A Chipman nozzle is used on the end of the pipe, which is placed at an angle directing the blaze through two lines of the same type. This keeps the pipe hot, and the flame follows the direction wanted.

Photo No. 2 shows a very simple single horse-drawn pump outfit, which is used principally in controlling small patches of weeds in the middle of the field, etc. The rubber tires are adjustable for various widths of row, and the Meyers pump is powered by a ¾ H.P. Lawson air-cooled engine. About 75 feet of hose is attached in order that the operator may move about.

Photo No. 3 shows two large burners mounted on trucks taking care of the weed burning along the highways and close to ditches. As is shown in the photo, a very effective blaze is kept up.

Over 2,000 different spots of white top and Russian knapweed are being burned up this year by the Park County Pest Control Board. Last year about 400 were taken care of, and in one year’s treatment of five separate burnings, at least 90 per cent of the places treated for white
top do not show any growth this year. The board has had experience in handling various weeds for a number of years, and finds that the burning method apparently is very successful in controlling some of the obnoxious weeds. Experiments are being conducted chiefly with four common obnoxious weeds—white top, Russian knapweed, Canadian thistle, and wild morning glory, or bindweed. The last two weeds mentioned have not been treated over long enough periods to enable the Board to determine whether or not burning provides a 100 per cent cure.

The five burnings can be carried out over a two-year period a great deal better and cheaper than through use of the chemical method. The average cost to date has been $88.00 per acre, as compared with $200.00 to $275.00 for the chemical treatment, which in many cases has either not been completely successful, or has so completely sterilized the soil that even after eight years of treatment no crops can be grown on the spots.

ONE INCH OF RAINFALL IS A LOT OF WATER

Rainfall is measured in inches, as we know. But exactly what does an inch of rain represent? Doesn’t sound like much, does it?

Here are some comparative figures: One gallon of water weighs 10 pounds and would cover about two square feet of surface with a layer one inch thick. To cover a square mile of the earth’s surface with a layer of rain one inch thick needs 120,000,000 pounds of water, or 12,000,000 gallons—which is a lot of water.

A good thunderstorm which pelts water down on the earth all night long will result in perhaps a half-inch of rain. If the storm covers a hundred thousand square miles before it wears itself out it will therefore deliver to the earth 600,000,000,000 gallons of water.

Lest this seem a considerable amount let us think of the Khasia hills in India, which are reputed to receive the heaviest rainfall in the world. The average is over 600 inches of rain per year, or 7,000,000 gallons of water per square mile.

HARVESTED 17½ TONS ON 175 ACRES

The Montgomery Ranch, Lovell district, grew over 175 acres of beets in 1939, and averaged 17.53 tons per acre. Fred Sproul, who is a partner with Mr. Montgomery, stated, “I do not think production in this district has reached anything like its maximum. I am sure that we will be able to see the day when we will harvest a great many more beets than at the present time. We have manure for only about one-half of our beets, and we follow a rotation with beets after beans. We manure the bean land, and find that the beets do better, as the manure is better rotted and better mixed with the soil. Our land is quite heavy, and we are not able to plant early if we must both manure and plow in the spring. By preceding the beets with the beans we can fall plow and have the ground in better shape the following spring. I also think that the first irrigation is very important, and should be done early enough to prevent the growth of the beets being checked.”

W. D. Baxter has just completed installing an irrigation well on his farm east of Scottsbluff. The well is equipped with a 10” pump and pumps from 1,200 to 1,500 gallons per minute.
Where Steamboats Met the Cactus

Beet Growing Area Near Custer, Montana, Was Once Western Terminal for Steamboats on Yellowstone. Drapers Pioneered Beet Area.

By JACK MAYNARD

TRACTOR-drawn harrows and seed drills were going at full blast in the broad, level fields on either side of the road as we drove from Hysham, Montana, northwest across the Yellowstone River to historic Pease Bottom. Constant rains in this area had delayed the planting of some 1,500 acres of beets that needed to be in the ground at the earliest possible moment.

A profusion of cottonwoods and willows growing along the river bank and the wide expanse of quiet, peaceful farmsteads in the Bottom gave little indication that 60 years ago this spot had been one of the busiest distribution points in Montana. Actually, from 1877 to 1882 Pease Bottom, with the town of Junction on the north side of the river, opposite the present town of Custer, and with Terry's Landing situated at its upper end, was one of the western terminals for the river steamboats that furnished the principal mode of transportation from St. Louis and the East until the railroad came in 1882.

The Custer Massacre on June 25, 1876, had stimulated the building of a group of additional forts throughout the state including Fort Maginnis, east of Judith Mountains near Black Butte, and Fort Custer at the mouth of the Little Big Horn near the present town of Hardin. The transportation of building supplies for these forts as well as general supplies of bacon, lard, flour and dry goods provided a thriving business for these river boats which took back cargoes of sun-dried buffalo hides and skins and furs secured from trappers.

They had to move quickly as the Yellowstone could only be navigated during high water in the spring. Boats left St. Louis in March and April, taking from 30 to 40 days to reach Terry's Landing where their cargoes were unloaded and freighted by The Diamond Bar ox outfits or bull trains to final destination. These boats were then stacked high with baled buffalo hides worth from $3 to $4 each and went back down the river on the June flood waters.

THERE were usually one or two of these boats at the Landing, tethered fore and aft by hawsers attached to "dead men" sunk in the bank. They represented a unique sight to the occasional cowboy or Indian surveying the scene from his horse on the nearby bluff. These boats were from 175 to 250 feet long and were all "stern wheelers." They carried loads of from 200 to 600 tons with a draft of only about 3 feet of water. Each was equipped with a set of "walking spars," which were powered by a small donkey engine on the deck called the "nigger." These spars were rigged with rope and pulley to "grasshopper" them over sandbars and shallow shoals when they became fast.

These boats were all wood burners despite the enormous supplies of coal that were later found close to the surface in this country. There was a wood yard adjacent to the river bank in nearly every bottom where split cottonwood and pine knots from
Look closely and you see a little lady with a parasol beside the rails on the deck of the steamboat. The boat is the F. I. Batchelor, anchored near Fort Pease in 1882. The same little lady is seen at the right, Mrs. M. I. Draper, and the same hardwood rails are the gate to her home, and the marker at the right showing the site of Fort Pease is in her yard. Below is her husband, M. I. Draper, county commissioner and beet grower. He is also shown with Charles Mann, P. H. McMaster and Pearl Mead by the old cabin, once a saloon in the rip-roaring days of old Fort Pease, which stands on their property at Pease Bottom, on the Yellowstone.

The pine hills had been piled in ricks 4 feet wide and 4 feet high. Boats would refuel two or three times daily as the available supply was burned quickly.

As soon as the boat had been tethered the purser would run down the gang plank and quickly measure off, with an 8-foot stick marked in the middle, the number of cords needed. His crew would then gather this wood up in their arms and carry it aboard “double-time.”

Cottonwood sold at $4 per cord, pine knots at $6 per cord, and the two were blended for best results. The thick black smoke from the pine tar, pouring out of the tall smoke stacks in great billowy clouds made an imposing sight as the little steamers “plowed” their way up the winding river. Because of its tortuous course and many rapids and sand bars, boats were always tied up at night and did not attempt to travel in the dark.

Mark Draper has planted 70 acres of sugar beets this spring on his 300-acre irrigated farm in Pease Bottom. Mark is 78 years old but doesn’t look a day over 60. He is one of Treasure County’s Commissioners and runs several hundred head of good range cattle in addition to handling his big irrigated farm. Mark came to Montana with a trail herd from Texas in 1884. His early life as a cowboy is a story in itself.

Bob Leavins, of Billings, told me of riding beef herd with Mark in 1890. One night Mark came in tired out from hours of vigil. Bob started to relieve him but was taken ill, where-
upon Mark put on his boots again and went back out to take his place. Mark still rides his horse but extensive farming duties require that he use a car most of the time.

Mark is a pioneer but insists that his wife is even more entitled to that distinction than he is, for Mrs. Draper came to Montana in 1882. She was at that time the wife of a captain of one of the river steamboats and they made several trips from St. Louis to Terry's Landing and also up the Missouri River to Fort Benton with supplies for other forts. She came to love the Montana country and later, when her husband passed away she took up a homestead at Pease Bottom and later married Mr. Draper. Their present home is situated on the site of old Fort Pease, which was built in July, 1875. Their front gate has been fashioned from hard wood taken from one of the old steamers.

A few rods from their home there is still standing the old log cabin that was a saloon in the days that Fort Pease, built in 1875, was populated by blue-clad cavalry troopers. The historic marker indicating the site of the Fort is located in the front yard of their attractive, modern home.

The lagoon where boats were tethered in front of their home is dry now and cottonwoods and willows have formed groves of tall, majestic trees in the old channel but along the former bank there are still to be seen the marks of the old "dead men" that served to tether the hawsers of steamboats there 60 odd years ago.

Mr. and Mrs. Draper are still hale and hearty and taking an active interest in the affairs of the day, but Mrs. Draper still thinks back with pleasure to those good old days of the cowboys and dashing army officers and the bustle and confusion of river transportation.

W. C. Loghry, left, and Peter Harris. Above is seen Mr. Loghry's new and modern home.

W. C. Loghry of the Janice station near Lyman, Nebraska, has employed Peter Harris for the past 12 years to work his beets. Together they have set up a laudable record, making an average of 18.75 tons per acre for the past 10 years. Mr. Loghry, during the past 12 years, has averaged from 40 to 70 acres of sugar beets, and in 1930 had a 21.72-tons-per-acre average on 69 acres. Peter Harris comes out from Lincoln each spring, where he has his home, and is now off to a good start on his 13th year working for Mr. Loghry. The Loghry farm is well managed with a sound rotation system and a good feeding program, resulting in high yields of sugar beets and other crops.
Blocker Helped North Sterling Men

North Sterling growers used the Dixie blocking machine to good advantage on several fields this season. Even though stands were not perfect due to delayed germination, remarkable results were obtained with this machine. Growers in several cases attributed the saving of their fields from abandonment to the mechanical blocking operation.

With dry conditions prevailing at thinning time, fields were blocked, cultivated and left temporarily. The removal of competition of excess beets and weed growth served to stimulate the growth of the blocked beets. Consequently, after a short period workers were able to go ahead with the thinning without loss of stand.

Some of the enthusiastic users of the machine were: Conrad Green, C. W. Pilkington, John D. Morostica, Fred J. Miller, John L. Morostica, and Henry Evers.—J. E. Facar.

Around the Territory

A new irrigation well is being drilled on the Jesse Campbell farm east of Brule, Nebraska.

Roy McKeeman, who farms north of Scottsbluff, and his landlord, Charles O. Walters, have been working together to install a pump in a drain. The water will be pumped 900 feet through an eight-inch stave pipe to the point of delivery on the land. This will water part of the farm, thus making available extra reservoir water for the remainder of the land. Cooperation between the tenant and landlord always gives good results.

Fred Law, fieldman for the Kersey, Kuner and Hardin stations at Greeley, is proud of the 15 new pumping plants that have been installed since early spring this year.

Mr. S. E. Shinkle of the Alden dump at the Greeley factory has had 15 years' experience fighting bindweed. His results convince him that if salt, Atlacide or Sodium Chlorate are used in sufficient quantities to kill the weed the land is out of use for five years. Mr. Shinkle prefers the clean cultivation method of using 3 18-inch duck feet on the front bar of the cultivator with 2 12-inch duck feet in between on the back bar. He is now using this method on 40 acres during 1940. The Shinkle motto is "Never let the roots of bindweed see light of day as sunshine strengthens the roots."

Weld County takes pride in the 40 county boys who were issued certificates by the Greeley Chamber of Commerce and the Weld County Agent's office for excellence and leadership in 4-H club and FFA project work.

Jacob Engleman, farmer southwest of Gering, reports that by use of a cross cultivator he was able not only to get an excellent stand, but finished his thinning on 35 acres of beets exceptionally early this year.
Table of Contents

Through the Sheaves ........................................... 118
The Crop Today—And Tomorrow ............................... 119
Heavy Irrigation Is a Waste of Water—Floyd E. Brown .... 122
Growing Beets Is Like Fattening Stock—Asa C. Maxson .... 127
Moisture Probe Is Cheap, Useful ............................. 129
Proteins and Molasses Featured—H. B. Osland .............. 130
J. P. "Pete" Benzel Does a Good Job ......................... 137
What the Irrigation Film Told You ........................... 139
This One-Year Lease Has Lasted Forty-five ................. 145
Averaged 17 Tons Per Acre for 30 Years .................. 146
Fall Plowing Pays Dividends, Loveland—J. L. Williams .... 147
Dried Molasses Beet Pulp Makes Self-Feeding Practical —Jack Maynard ........................................... 151
Morgan Man Makes Water-Saving Test ....................... 152
From Section Hand to Half Section Owner—J. L. Williams 153
Fighting Weeds With Fire—O. E. Frisbie .................... 156
Where Steamboats Met the Cactus—Jack Maynard ......... 158
Blocker Helped North Sterling Men ........................ 161
Around the Territory .............................................. 161

The Great Western Sugar Co., Longmont, Colo.
THROUGH THE LEAVES

September, 1940

THE GREAT WESTERN SUGAR COMPANY
DEPENDABILITY of the beet crop in this region is being demonstrated again this year.

In spite of a very dry summer, with irrigation supplies below normal, it appeared as we went to press that average yields might approximate 12 tons per acre in Colorado and Nebraska and about 13½ tons in the Billings-Lovell district.

Good rains around the middle of September supported yield expectations and put the soil in condition for increased fall preparation. Thousands of acres have already been disked and plowed.

THE domestic sugar price, according to the Department of Agriculture, is lower than it has averaged under the sugar program in the last seven years. On August 26 the domestic quota was reduced by 136,383 tons and on September 5 a widely printed press article credited sugar officials with another effort to improve the price.

However, basic prices have continued at low levels. Keen competition has been maintained by all processors seeking markets. Since June buyers have been able to purchase sugar on an effective basis of $4.00 per 100 pounds, after various allowances, with corresponding reduced net return.

The Company, with an augmented sales department, is endeavoring to realize as high a net return as possible under the difficult market conditions prevailing.
Fall Preparation Means Fall Manuring

By DR. H. E. BREWEAKER, Agronomist
Longmont Experiment Station

PROBABLY every practice which is more or less generally accepted is subject to some exceptions. This is true with fall preparation of land to be planted to sugar beets the following spring.

Getting the job done as soon as possible might be said to be the one universal characteristic of the most successful growers, and fall preparation is just one of the requirements in their farm management program. However, exceptions to this rather general rule are recognized, particularly in certain areas, as follows:

1. Soils which are sandy in nature are likely to blow or drift during the winter; these soils can be plowed more quickly after a rain and earlier in the spring than the heavier silt or clay soils. The accepted practice on sandy soils is to plow and work into a seed bed only a short time preceding planting.

2. Soils subject to alkali may be in better condition for seed germination and seedling development if plowed shortly before planting. Fall plowing on such soils tends to result in a rise of the alkali during the winter to concentrate in the surface or planting area, thus jeopardizing the germination of the seed and resulting stand.

Even though these conditions exist in fairly large areas, particularly in the Nebraska district, yet they constitute exceptions to the rather general practice of fall preparation for sugar beets. Recognizing these as valid exceptions we may now consider the advantages to and methods used in fall preparation on the large majority of farms where it constitutes a successful practice.

Enables Timely Planting

THERE are several obvious reasons for the desire to prepare land in the fall for sugar beet production the following season. In the first place, it is a timely practice which eases the spring "rush" of work and makes early planting possible with the usual consequence of better stands and greater incomes. Some growers
“Getting the job done as soon as possible,” Dr. Brewbaker points out, is “the one universal characteristic of the most successful growers”—and this picture, taken July 19, 1940, in the Proctor District, Sterling, shows how Sylvester Soucie completed binding and disking 85 acres of barley at the same time. The ground was still moist after grain was cut and the disk was easily pulled by the tractor in second gear.

still either fail to realize these advantages or they let other factors prevent them from changing over from spring to fall preparation; or in certain cases, a very few cases, they just don’t get around to do the job until the last minute.

In the second place, the soil mellows and settles during the winter, all of the rainfall is absorbed, and the harrowing and floating operations just preceding planting result in very little loss of stored up soil moisture, the loss of which may mean poor stands. Spring plowing and the necessary subsequent operations to prepare the seed bed often result in the loss of much of the surface moisture. The alternatives then are to irrigate up, to be content with irregular or weak stands, or wait and hope for rain.

In the third place fall preparation means fall manuring which has many obvious advantages in itself. Well rotted manure is better fertilizer than the fresh strawy product; fall manuring permits the rotting process to continue through the summer. Weed seeds become non-viable, straw and other organic matter decay and become more easily worked into the soil to produce a firm seed bed. The temporary tie-up of nitrogen by the soil (“denitrification”) following the application of straw or strawy manures in the spring is avoided by applying the more fully decomposed manure in the fall.
Probably the most satisfactory place for storage of manure through the summer is the corral where it was produced. If adequate bedding has been used and the manure is a foot or more deep, there will be little loss from leaching.

How to Store Manure Through the Summer for Fall Application

PROBABLY the most satisfactory place for storage of manure through the summer is in the corral where it was produced. If adequate bedding has been used and the manure is a foot or more deep and well packed there will be little loss from leaching under irrigated conditions where rainfall is usually quite limited, if it is left in the corral, undisturbed through the summer.

Under some conditions it appears desirable or necessary to remove the manure from the corral in the spring. One of the best practices under these conditions is to pile the manure at the end or side of the field where it is to be spread after the crop is removed. There may be some tendency to heating when piled, but if it is fairly wet when piled this should be reduced to a minimum. Leaching from heavy rains characteristic of the more humid areas of the United States is seldom a factor in irrigated areas.

Shift from Spring to Fall Manuring

HOW can the shift from spring to fall manuring be accomplished? It should be easy for the owner-operator; perhaps not so simple for the tenant who must get some returns for the labor invested.
Laurence Bauwens of Fromberg, Montana, was applying manure as early as August 8, and L. R. Mondt, Fieldman, shows us how he did it with a truck holding 4 to 5 spreader loads. Photo (1) shows Martin Kilwien raising the side lifting-arm out of the carrying bracket. In (2) he lets the side arm to the ground. The arm has a steel point. With the side arm down, as shown in (3), the driver starts backing the truck. The points catch in the ground and the bed is forced into the air. Frame of the bed (4) is hinged about two-thirds back on stringers. The load is backed until manure starts sliding down. Then (5) the truck is started forward and manure slides off as truck drives out. Manure sliding off rear holds bed in continued unloading position. With the load off (6) shows the men who engineered the job: left to right, Pete De Saveur, Laurence Bauwens and Martin Kilwien.

in manure. However, the tenant who recognizes the value of changing his practice to this extent should obtain cooperation with his landlord if he can sell the idea of more efficient farm operation as a legitimate expectation. It might even be possible to purchase manure for the year when the change was made.

The owner might well afford to draw up his lease stipulating fall preparation with the employment of a renter who will adopt it
in principle, as well as in general practice. On the other hand the owner should agree to reimburse the renter for his labor in the event that the renter left prior to his cashing in on the additional income resulting from the manural application.

Fall manuring is a typically western practice; it is not recommended in the Central States. It is typically western because of the conditions mentioned above which make it a correct practice for most soils in this semi-arid, or irrigated area.

“Remarkably High Value” for Beet Tops Shown by Three-Year Government Test

Lamb Feeding Experiments Conducted at U. S. Belle Fourche Field Station, Newell, South Dakota

By BEYER AUNE

Associate Agronomist and Superintendent

EXPERIMENTS on lamb feeding, conducted in cooperation with the United States Department of Agriculture and the South Dakota Agricultural Experiment Station, are of particular interest to sheep feeders in irrigated regions, such as those of South Dakota, where the feeding of sheep is combined with the growing of sugar beets. The results show that sugar beet by-products may be used successfully in feeding lambs. In addition, the farmer obtains the manure which is a valuable asset in beet culture.

The results of the series of experiments just completed, 1937-38 to 1939-40 inclusive, as contained in the table on the following page, afford a direct comparison between standard grain or grain-and-corn-silage rations and rations containing the sugar beet by-products: beet tops, pressed beet pulp, and beet molasses. The value of the beet by-product rations and especially those containing beet tops is indicated by a comparison of the feed required to produce one hundred pounds of gain in the various lots.

In line with the work of a similar nature at other stations, the experiments indicate the higher cost and lower yield of a corn-silage-alfalfa ration. Above all, it sets forth clearly the remarkably high value of beet tops in the lamb fattening ration.

At the time beets are harvested in the fall the tops are still at an early stage of growth. The results of the experiment seem to indicate a high grain equivalent value for their nutrient content. Beet tops purchased at fifty cents per ton of beets returned in one
Results of the Lamb Feeding Experiments Conducted at the U. S. Belle Fourche Field Station, at Newell, South Dakota, During the Three Seasons, 1937-38, 1938-39, 1939-40 Three-year Averages

<table>
<thead>
<tr>
<th>Lot Number</th>
<th>Number in Each Lot</th>
<th>Initial Weight (Average)</th>
<th>Final Weight (Average)</th>
<th>Gain Per Lamb</th>
<th>Average Daily Gain</th>
<th>Feed Required Per 100 Pounds of Gain:</th>
<th>Cost of Feed Per 100 Pounds of Gain</th>
<th>Feed Cost per Lamb</th>
<th>Interest</th>
<th>Death Loss</th>
<th>Freight and Marketing</th>
<th>Total Cost per Lamb</th>
<th>Final Weight at Feed Lot</th>
<th>Receipts per Lamb</th>
<th>Loss per Lamb</th>
<th>Dressing Weight (average)</th>
<th>Dressing Per Cent (average)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>100</td>
<td>70.80</td>
<td>70.15</td>
<td>0.247</td>
<td>329</td>
<td>$8.10</td>
<td>$8.81</td>
<td>0.10</td>
<td>0.68</td>
<td>4.68</td>
<td>$12.48</td>
<td>98.08</td>
<td>$8.25</td>
<td>$0.56</td>
<td>48.50</td>
<td>49.88</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>100</td>
<td>69.58</td>
<td>70.60</td>
<td>0.266</td>
<td>354</td>
<td>$8.11</td>
<td>$8.97</td>
<td>0.10</td>
<td>0.68</td>
<td>4.68</td>
<td>$12.46</td>
<td>95.20</td>
<td>$8.04</td>
<td>$0.55</td>
<td>48.27</td>
<td>49.98</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>100</td>
<td>100.13</td>
<td>99.00</td>
<td>0.295</td>
<td>289</td>
<td>$8.28</td>
<td>$9.00</td>
<td>0.10</td>
<td>0.68</td>
<td>4.68</td>
<td>$12.52</td>
<td>100.78</td>
<td>$8.55</td>
<td>$0.54</td>
<td>48.51</td>
<td>49.92</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>100</td>
<td>31.59</td>
<td>31.59</td>
<td>0.277</td>
<td>272</td>
<td>$8.05</td>
<td>$8.68</td>
<td>0.10</td>
<td>0.68</td>
<td>4.68</td>
<td>$12.51</td>
<td>101.74</td>
<td>$8.40</td>
<td>$0.57</td>
<td>48.34</td>
<td>49.85</td>
</tr>
</tbody>
</table>

**Footnotes:**
- Shelled corn, $9.33 ton; pressed pulp, $1.76 ton; molasses, $18.00 ton; corn silage, $3.50 ton; bone meal, $5.07 cwt. Beet tops are figured at $0.50 per ton yield of beets.
comparison (Lots 3 and 4) $1.25 for the tops fed per ton of beets. In this comparison, the lambs in Lot 4 used tops from 1.61 tons of beets with 272 lbs. of corn, 979 lbs. of pressed beet pulp, and 404 lbs. alfalfa hay, to produce one hundred pounds of gain. In comparison with feed used in Lot 3, the tops from each ton of beets replaced:

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn</td>
<td>10.56 lbs.</td>
<td>$0.121</td>
</tr>
<tr>
<td>Pressed beet pulp</td>
<td>31.70 lbs.</td>
<td>$0.328</td>
</tr>
<tr>
<td>Alfalfa hay</td>
<td>235.40 lbs.</td>
<td>$1.098</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$1.247</strong></td>
<td></td>
</tr>
</tbody>
</table>

From the above it will be noted that the tops per ton of beets were worth $1.247 in feed replacement value.

In the other comparison, with barley replacing corn and beet pulp and molasses added, (Lots 5 and 6) the tops showed a value, at existing feed prices, (see summary table) of $1.36 per ton of beets. In this comparison the lambs in lot 6 used tops from 1.60 tons of beets with 290 lbs. of barley, 1002 lbs. pressed beet pulp, 47 lbs. molasses and 411 lbs. alfalfa hay. In comparison with feed used per cwt. of gain in Lot 5, fed the same ration without beet tops, the tops per ton of beets fed in Lot 6 replaced the following:

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barley</td>
<td>13.2 lbs.</td>
<td>$0.128</td>
</tr>
<tr>
<td>Pressed beet pulp</td>
<td>47.8 lbs.</td>
<td>$0.442</td>
</tr>
<tr>
<td>Molasses</td>
<td>2.5 lbs.</td>
<td>$0.016</td>
</tr>
<tr>
<td>Alfalfa hay</td>
<td>251.6 lbs.</td>
<td>$1.171</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$1.357</strong></td>
<td></td>
</tr>
</tbody>
</table>

This shows that the tops per ton of beets were worth $1.357 in feed replacement value.

A comparison of Lots 6 and 7 shows no advantage to the feeding of bone meal to these lambs.

This work was replicated three years with lots of 100 lambs each. Two years the tops showed a normal rate of production in relation to beet yields, but the first year there was an abnormally low production of beet tops in proportion to the weight of beets. The following table shows the production of tops in comparison to the yields of beets:

<table>
<thead>
<tr>
<th>Years</th>
<th>Tons Beets Per Acre</th>
<th>Yield of Beets (tons)</th>
<th>Dried Tops Per Acre (tons)</th>
<th>Total Tons Tops</th>
<th>% Dried Tops of Beet Yield</th>
<th>Ratio Tops to Beets</th>
</tr>
</thead>
<tbody>
<tr>
<td>1937-38</td>
<td>15.67</td>
<td>235</td>
<td>1.70</td>
<td>25.55</td>
<td>10.87</td>
<td>1 : 9.2</td>
</tr>
<tr>
<td>1938-39</td>
<td>12.50</td>
<td>300</td>
<td>2.53</td>
<td>60.80</td>
<td>20.36</td>
<td>1 : 4.9</td>
</tr>
<tr>
<td>1939-40</td>
<td>7.55</td>
<td>59</td>
<td>1.45</td>
<td>17.70</td>
<td>19.16</td>
<td>1 : 5.0</td>
</tr>
</tbody>
</table>

While there has been considerable variation in yield of field-cured dried tops to yield of beets in different rotations, the yields in normal rotations coincide fairly well with the studies published
In this comprehensive three-year experiment lambs in lots of 100 each returned $1.25 from tops per ton of beets in one test, and $1.36 per ton of beets in another, in an average of three feeding trials, Belle Fourche Field Station, Newell, South Dakota.

by the Colorado Experiment Station which indicate a dried tops return equivalent to nineteen to twenty per cent of the weight of beets harvested.

The beet grower who realizes that his tops are worth $1.25 to $1.36 per ton of beets should hesitate to sell them to speculative feeders at twenty-five to fifty cents per ton beet yield. This is an undue tax on the industry to let those who do not grow beets profit so much from their principal by-product.

The beet grower should also appreciate the value of conserving the feeding value of the tops to the very best advantage. Tops left lying in the windrows for weeks will be worth little more than alfalfa handled similarly. They should be dried and stacked or riced as quickly as possible.

Lamb feeding has just about passed from large operators, who bought all their feed, to farmers who are either owners or operators of land. It should be considered a profitable means of marketing roughages such as alfalfa hay and fall pastures, and grains and sugar beet by-products, i.e., beet tops, pulp, and molasses.

LAMB feeding is not a speculative enterprise when conducted from year to year as is shown in the table on the following page using a corn and alfalfa ration which has been used continuously for the thirteen years’ lamb feeding experiments at this station.

For several years a record of the number of spreader loads of manure from 100 lambs has been kept. Where lambs are confined in open feed lots for about 120 days, allowing about 12 to 15
sq. ft. per lamb, and bedded liberally with straw, a hundred lambs will produce from thirty to thirty-six spreader loads.

From some thirty years’ observations on the irrigated rotations at this station all crops are soil-depleting and remove fertility from the soil. This must be returned to the soil either in barnyard manure, commercial fertilizer or both if crop production is to be maintained or improved. In two similar six-year rotations (three years alfalfa, potatoes, oats and beets) during the six-year period 1930-35 inclusive, where manure was applied at the rate of twelve spreader loads per acre before the beet crop, the average increase in yields over the unmanured rotation was 5 tons of sugar beets, 1.3 tons of alfalfa hay, 10 bushels of potatoes, and 6 bushels of oats, which at local prices gave an increased income of $10.00 per acre in a six-year rotation where manure was applied once in the rotation or every sixth year on the same field.

During the 13 years, 1927-40, that lamb feeding has been conducted at this station, four years show a loss and only two of the four were really serious losses. The profit per lamb for the thirteen years is forty-five cents after paying $9.31 per ton for alfalfa hay and $1.33 per cwt. for corn. The importance of live stock feeding in an irrigated beet growing section cannot be over emphasized.

U. S. BELLE FOURCHE FIELD STATION
Newell, South Dakota

Lamb Feeding Experiments With a Corn and Alfalfa Ration During the 13-Year Period, 1927 to 1940 Incl.

<table>
<thead>
<tr>
<th>Year</th>
<th>Cost Price of Lamb Cwt.</th>
<th>Selling Price of Lambs Cwt.</th>
<th>Corn Price Cwt.</th>
<th>Alfalfa Price Ton</th>
<th>Year’s Profit</th>
<th>Year’s Loss</th>
<th>Shrink from Feed Lot to Sioux City (pounds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1927-28</td>
<td>$12.00</td>
<td>$13.75</td>
<td>$1.90</td>
<td>$8.50</td>
<td>$0.83</td>
<td>6.32</td>
<td></td>
</tr>
<tr>
<td>1928-29</td>
<td>12.00</td>
<td>16.40</td>
<td>1.70</td>
<td>10.00</td>
<td>3.22</td>
<td>7.95</td>
<td></td>
</tr>
<tr>
<td>1929-30</td>
<td>12.00</td>
<td>10.00</td>
<td>1.70</td>
<td>10.00</td>
<td>2.99</td>
<td>7.00</td>
<td></td>
</tr>
<tr>
<td>1930-31</td>
<td>5.50</td>
<td>8.25</td>
<td>1.25</td>
<td>9.00</td>
<td>.39</td>
<td>9.48</td>
<td></td>
</tr>
<tr>
<td>1931-32</td>
<td>4.00</td>
<td>6.45</td>
<td>.85</td>
<td>10.00</td>
<td>.02</td>
<td>8.13</td>
<td></td>
</tr>
<tr>
<td>1932-33</td>
<td>4.00</td>
<td>5.65</td>
<td>.65</td>
<td>4.50</td>
<td>.67</td>
<td>4.50</td>
<td></td>
</tr>
<tr>
<td>1933-34</td>
<td>5.50</td>
<td>9.35</td>
<td>.80</td>
<td>5.00</td>
<td>2.75</td>
<td>5.50</td>
<td></td>
</tr>
<tr>
<td>1934-35</td>
<td>5.25</td>
<td>9.25</td>
<td>1.60</td>
<td>15.00</td>
<td>.31</td>
<td>6.00</td>
<td></td>
</tr>
<tr>
<td>1935-36</td>
<td>7.50</td>
<td>10.70</td>
<td>1.20</td>
<td>6.00</td>
<td>2.03</td>
<td>4.39</td>
<td></td>
</tr>
<tr>
<td>1936-37</td>
<td>7.00</td>
<td>11.00</td>
<td>2.15</td>
<td>15.00</td>
<td>.42</td>
<td>4.43</td>
<td></td>
</tr>
<tr>
<td>1937-38</td>
<td>9.50</td>
<td>8.50</td>
<td>1.15</td>
<td>8.00</td>
<td>1.99</td>
<td>4.15</td>
<td></td>
</tr>
<tr>
<td>1938-39</td>
<td>6.50</td>
<td>8.85</td>
<td>1.15</td>
<td>10.00</td>
<td>.27</td>
<td>5.45</td>
<td></td>
</tr>
<tr>
<td>1939-40</td>
<td>7.60</td>
<td>9.25</td>
<td>1.15</td>
<td>10.00</td>
<td>.05</td>
<td>5.55</td>
<td></td>
</tr>
<tr>
<td>13-yr. avg.</td>
<td>7.56</td>
<td>9.80</td>
<td>1.33</td>
<td>9.31</td>
<td>1.21</td>
<td>1.26</td>
<td>6.06</td>
</tr>
</tbody>
</table>

Average profit per lamb for 13 years is $0.45.
Beet tops figure prominently in the feeding operations of these Montana men pictured above:

1. Thousands of lambs are fattened each year from these self-feeders filled with oats and dried molasses beet pulp and cut alfalfa in feedlots of Mackey Sheep Company at Mossmain. They show a marked gain of about 4 lbs. per day and dress close to 50%.

2. Joe Kuchinski of Bridger and his fat calves, fattened on beet tops, barley, dried beet pulp and alfalfa with bone meal.

3. The Glantz boys at Billings handle hundreds of tons of manure in this efficient manner. It is conserved in their feed lots until they are ready to spread it and quickly plow it under in the fall.

4. Henry Yost of Yost Farms Company, Billings, with a bunch of choice fat yearlings that went to the northwest market at top prices this year. The Yosts use beet tops extensively in their cattle feeding operations.

5. Tom Kemph and Farmer of Custer with a load of bone meal. They fed the standard ration for cattle—wet pulp, tops, barley, bone meal and alfalfa.

6. A Billings Pioneer—John A. Miller—and his cattle, fattened on beet tops, dried pulp, barley and alfalfa with bone meal. They sold at a good profit on the eastern market.
Beet Tops Worth Much More to Growers Than Market Value Indicates

By JACK MAYNARD

THE U. S. Belle Fourche experiment station at Newell, South Dakota, recently completed a 3-year series of feeding experiments in which they used 100 lambs per lot. In these experiments beet tops priced at 50c per ton of beets showed feed replacement values of $1.25 and $1.36 for tops fed per ton of beets.

A survey of 38,312 lambs pastured on beet tops and alfalfa by beet growers in southern Montana and northern Wyoming last fall showed an average net value for tops of $1.40 per ton of beets.

Results such as these indicate a much higher feeding value for beet tops than present market prices of 25c to 50c for tops per ton of beets would indicate. Beet tops are harvested at topping time when still at an immature stage of growth.

Recent experiments at the Washington station with range grasses cut at a comparable stage of growth have shown these grasses to be exceptionally high in feed nutrients and vitamins at that time. These results which have a direct bearing in indicating correspondingly high feeding values in beet tops justify much more

Try and get it! Somewhere under this snow, being tramped down into the mud, are the tops from a 15-ton beet crop. The cost of replacing this wastefully handled feed runs about $18.75 to $21.00 per acre, according to recent tests.
care in proper conservation and feeding. Highly digestible nutrients and vitamins are also highly perishable if left exposed too long in the field.

There were some 9,133,000 tons of beets harvested in 9 western states last year. At an average market price of 30c per ton of beets the tops were worth about $2,740,000. According to the experiments and survey reported above these tops, properly conserved and fed had a value of about $1.30 per ton of beets or over 9 million dollars more than their market value.

The answer is simple. Every beet grower who can feed his own tops this year should plan to do so and if tops are carefully cured and stored in dry ricks it is safe to figure that they have at least 40% of a grain value in fattening rations for cattle or sheep. With the present disparity between their actual feeding value and market value beet growers can hardly afford not to feed their own tops.

Results Secured Pasturing Beet Tops During 1939-40 Season

<table>
<thead>
<tr>
<th></th>
<th>Moran &amp; Fahrenbruch</th>
<th>John Fink</th>
<th>Jack Drew</th>
<th>Lamb Feeders,</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fromberg, Montana</td>
<td>Forsyth, Montana</td>
<td>Clearmont, Wyoming</td>
<td>Worland, Wyoming</td>
</tr>
<tr>
<td>Total beet tonnage from which tops were pastured</td>
<td>487</td>
<td>690</td>
<td>1043</td>
<td>25183</td>
</tr>
<tr>
<td>No. lambs pastured</td>
<td>841</td>
<td>1000</td>
<td>1097</td>
<td>35374</td>
</tr>
<tr>
<td>Days on tops</td>
<td>48</td>
<td>67</td>
<td>73</td>
<td>53</td>
</tr>
<tr>
<td>Lamb days</td>
<td>40368</td>
<td>67000</td>
<td>80081</td>
<td>1874822</td>
</tr>
<tr>
<td>Lambs pastured per ton beets</td>
<td>1.73</td>
<td>1.45</td>
<td>1.05</td>
<td>1.40</td>
</tr>
<tr>
<td>Lamb days per ton beets</td>
<td>82.8</td>
<td>97.1</td>
<td>76.7</td>
<td>74.4</td>
</tr>
<tr>
<td>Initial weight per lamb</td>
<td>67.8</td>
<td>64.8</td>
<td>62</td>
<td>64.8</td>
</tr>
<tr>
<td>Final weight per lamb</td>
<td>(4% shrink)</td>
<td>77.8</td>
<td>80.0</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total gain per lamb</td>
<td>10.0</td>
<td>15.2</td>
<td>18.0</td>
<td>12.0</td>
</tr>
<tr>
<td>Avg. daily gain per lamb</td>
<td>.21</td>
<td>.227</td>
<td>.24</td>
<td>.226</td>
</tr>
<tr>
<td>Lamb gain per ton beets</td>
<td>17.2</td>
<td>22.0</td>
<td>18.9</td>
<td>16.86</td>
</tr>
<tr>
<td>Supplemental feed per ton of beets—Alfalfa lbs.</td>
<td>82.1</td>
<td>100.0</td>
<td>Stubble</td>
<td>Stubble</td>
</tr>
<tr>
<td>Feed cost per cwt. gain</td>
<td>$3.52</td>
<td>$1.96</td>
<td>$2.11</td>
<td>$2.37</td>
</tr>
<tr>
<td>Net tops value per ton beets</td>
<td>$1.17</td>
<td>$1.56</td>
<td>$1.51</td>
<td>$1.35</td>
</tr>
<tr>
<td>(8c per lb. gain, 4% shrink)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

These figures submitted from farmers in various areas represent gains secured during the early part of fattening operations while lambs were being pastured on tops with roughage alone.

Feed costs based on alfalfa hay at $6 per ton beet tops at 40c per ton beets.
Fertility is the first requisite of good farming. (1) Don Barkley, left, hauling out manure on the C. E. Barkley farm, Fort Morgan; (2) Clarence Akers loading manure at Longmont; (3) Frank Nowacki, Eastlake, Brighton district, running his spreader on disked stubble for 1941 beets; (4) His 1940 beets still to be harvested, Frank Barnes, Longmont, starts building tonnage for his 1941 crop; and (5) William Eppinger, Brighton, who hauls manure 15 miles. He grew 112 acres of beets in 1940.

What Is a Ton of Manure Worth?

By C. V. MADDUX

BEFORE you read any further, ask yourself: What is the average value in dollars or cents of a ton of ordinary feed-lot manure spread on the land—based on your own experience, in growing beets in rotation with alfalfa and other customary crops? It will be interesting to compare your valuation with that here given, for another beet-growing farm.

I have asked many beet growers this question. They have—with few exceptions—said that whereas they know manuring pays, and in fact is necessary for good farming, they do not definitely
know its cash value per ton, for it is difficult and usually imprac­
tical to resort to the means necessary to determine it.

In the first place, it is not customary to make a written record
of the number of spreader loads, or tons, applied per acre each
year. Then, in order to determine accurately the yields per acre
for at least three consecutive years, for the crops grown on ma­
nured land, and for crops grown on land not manured, the fields
have to be measured, and the crops weighed—whether they are
sold or fed on the farm.

Also those fields may carry different crops the second year,
etc. Furthermore, it often occurs that there is an inherent differ­
ence in the productivity of different fields on the same farm due
to nature of the soil, or the sub-soil, or both, or due to previous crop
history, or due to type of cultural practice used on the fields in
question during the several growing seasons—for example, one
of the fields may be irrigated more than the other. Those dif­
ferences make single comparisons unreliable, in many instances.

Half the Strength in First Crop

IT IS a well known fact that only about one-half of the “strength”
of manure is used by the first crop. Consequently, in order to
determine the dollar value of a ton of manure, it is necessary to
take into account the residual value of it by determining the effect
which it has on the second and third crops, at least.

Growers have cited that in dry years, they seem to get less ben­
efit from manure than normally. Manure applied in the fall is
more beneficial to the first crop than if it be applied in the spring.
A ton of manure is worth more when applied at a moderate rate
of say ten tons per acre, than when applied at the rate of twenty
tons. Then, too, the increase in yields per ton of manure will be
greater if the field be “starving” for lack of manure, than if it
has been manured regularly.

Growers have also cited that the dollar value of a ton of manure
directly depends on the sale value of the crops grown; and that,
since crop prices vary from year to year, the value of a ton of
manure fluctuates. Hence, it must be given in terms of an average
for a suitable period of years.

Sheep manure is more potent than cattle manure; and ma­
nure from live stock “finished” on heavy grain feed is worth more
than that from live stock “warmed-up” on roughages and light
grain feed; and also manure which has been leached by rain is
less valuable than that which has been kept in good condition.
Those features were brought out by growers in some of the con­
versations. From notes made of their statements, I quote the
following samples:
"I do not know how much a ton of manure is worth, but I do know I could not stay in business on an irrigated farm without applying manure."

"A spreader load of manure (1½ tons) is worth $5.00. That makes a ton worth $3.35 after it has been spread. To supplement manure from my feed lots, I haul all I can get in town located 5 miles distant."

"Experience taught me that good farming calls for more than crop rotation, including alfalfa. Manure is also required to keep up fertility. I really have not figured what a ton of manure is worth."

Five growers in one dump district, respectively, gave the following values for one ton of manure: 75c, $2.00, $1.50, $2.25 and $1.00.

**Important to Know Money Value**

It is difficult to set a dependable dollar value on a ton of manure. However, it is important that a grower know it as accurately as possible, because when he does, he can better determine what he can afford to do to acquire it, or to conserve it against waste by leaching or otherwise. Obviously, if its value be $5.00 a ton, he is justified to do more to obtain or conserve it than if it be worth only $1.00 a ton.

One of the principal purposes for bedding with straw is to reduce the loss of liquid manure. Then, too, of course, straw of itself has value as manure after it is partially decayed. Frequently it develops that straw can only be obtained by a long haul. When grower knows the approximate cash value of a ton of manure, he can better decide how far he is justified in hauling straw. That is only one of the many uses that information serves.

Fortunately reliable records are available which enable calculation of the dollar-and-cents value of a ton of manure, applied on a farm near Scottsbluff where beets are grown in a 6-year crop rotation. That rotation includes alfalfa (3 years), potatoes, small grain and beets, in the order named. When this land was broken out of native sod, and before the systematic crop rotation system was started it produced fair crop yields.

**Records Cover Quarter Century**

Those records cover a period of 25 years, some "wet" and others "dry"—years of high crop prices, and others of low crop prices. The average yields of all crops, for that period, reflect the benefit of each application of manure on the first crop, and on all succeeding crops.

The manure was applied each year at the rate of 12 tons per acre on 1/6 of the total acreage, and that acreage was then planted
to beets. In 24 years each field on the farm was manured 4 times at the stated rate of 12 tons per acre. The area of each field was rigidly maintained the same throughout the 25-year period, and there was no deviation whatever from the mentioned crop rotation plan.

In order to measure the benefit of applying manure in this 6-year rotation, an equal adjoining acreage has been farmed on basis of exactly the same crop rotation system, but no manure whatever was applied to it. Accurate records were kept of crop yields on both farms throughout that long period, whether the crop was sold or fed on the farm.

Those average yields are given here:

**TABLE I**

<table>
<thead>
<tr>
<th></th>
<th>Manured</th>
<th>Not Manured</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beets</td>
<td>18.7 T.</td>
<td>14.2 T.</td>
<td>4.5 T.</td>
</tr>
<tr>
<td>Potatoes</td>
<td>311.0 bu.</td>
<td>289.0 bu.</td>
<td>22.0 bu.</td>
</tr>
<tr>
<td>Oats</td>
<td>73.1 bu.</td>
<td>67.3 bu.</td>
<td>5.8 bu.</td>
</tr>
<tr>
<td>Alfalfa (3 yr.)</td>
<td>3.77 T.</td>
<td>3.50 T.</td>
<td>.27 T.</td>
</tr>
</tbody>
</table>

On these two farms the alfalfa is always seeded in the spring (following the beet crop) without a nurse crop, after the land has been disked and harrowed.

For a farm of 120 acres of plow-land those average increases in yield per acre, due to systematic application of manure, would annually amount to the following:

**TABLE II**

<table>
<thead>
<tr>
<th></th>
<th>Beets—20 A. x 4.5 T.</th>
<th>=</th>
<th>90 T. Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potatoes</td>
<td>22.0 bu.</td>
<td>=</td>
<td>440 bu. Increase</td>
</tr>
<tr>
<td>Oats</td>
<td>5.8 bu.</td>
<td>=</td>
<td>116 bu. Increase</td>
</tr>
<tr>
<td>Alfalfa</td>
<td>.27 T.</td>
<td>=</td>
<td>16.2 T. Increase</td>
</tr>
</tbody>
</table>

In total 240 tons of manure are required each year to carry out this plan on 120 acre farm, where the mentioned crop rotation system is used and 20 acres are manured annually at the rate of 12 tons per acre. That amount of manure can be realized from 45 head of 1000 lb. steers fed 180 days (or 1500 lambs fed 100 days) plus the normal number of work horses, cows and hogs—provided the manure is well conserved, and undue losses by careless handling are prevented.

More feed is normally produced on a 120-acre farm, operated on the basis mentioned, than is required for feeding 45 steers or 1500 lambs, in addition to the work horses, etc. However, if only that number be fed, it has been calculated that considerably more manure will be produced than the 240 tons called for by the cropping system under consideration.
Early in August Don Spillman (1) was disking while Jake Schaffer was running the spreader on the Spillman farm near Julesburg; (2) Here is the beginning of a 20-ton beet crop in Morgan county; (3) George Walters at Brush started hauling manure August 1; (4) Jake Propp, Fort Morgan, loading manure for David Sagel, both operating farms for J. A. M. Crouch; and (5) late-summer loading in the feed lot on the Ruey Hartman farm, Longmont, operated by Leon Darras.

Furthermore, if on this 120 acre farm, 20 acres of corn be grown in the rotation, in place of potatoes, that will increase the farm's capacity for feeding cattle or sheep.

Also, if instead of devoting 50% of the land to alfalfa as called for in this rotation plan, a different rotation system be adopted, that calls for 25% of the land in alfalfa each year, and barley or corn be planted on the other 25% of the total acreage—then the farm's capacity for feeding will be still further increased.

Manure Worth $3.57 Per Ton

HENCE, it is possible to acquire as much—and more—manure as is required to manure 1/6 of the total farmed acreage each year at 12 tons per acre.

Table I shows the average (25 years) yields per acre realized "with manure" and "without manure" on that Scottsbluff farm. Anyone can apply his own values per bushel or per ton to those yields, and thus get the gross earnings for one acre of the farm that was manured, and also of the farm that was not manured.
From each of those figures, subtract the production costs, and obtain what may be termed the “First Net” income per acre.

That has been done. It was found that the “First Net” per acre for the manured land exceeded that for the land not manured by $7.14. Twelve tons of manure per acre applied on 1/6 of the farmed land is equivalent to two tons on all the land. Hence, $7.14 is the worth of 2 tons, and one ton of manure is found to be worth $3.57.

(More detailed information on this subject can be obtained from Bulletin 318 issued by the University of Nebraska, College of Agriculture at Lincoln, Nebraska, and written by Lionel Harris, Acting Superintendent of the Scottsbluff Substation.)

**Tuning in on Soil Moisture**

*Farmers Enthusiastic Over Simple Electrical Method Pointing to Increased Economy and Efficiency in Use of Water*

ABOUT 175 farmers—150 in Colorado and 25 in Nebraska—participated in irrigation experiments this year in what may prove to be the most important development in control of irrigation water in the history of irrigated farming in this region.

Actually “tuning in” on soil moisture conditions, with view to anticipating wilting and applying timely water, in proper amounts, is the basis of this program undertaken by the Great Western Sugar Company in cooperation with farmers and Colorado and Nebraska Experiment Stations of the U. S. Department of Agriculture.

The program was launched in the fall of 1939 when the Company took several hundred soil samples from various farms, to depths of 48 inches, as a basis for establishing some method of moisture determination in 1940. Considerable work had been done along this line in California, and at the time the Company launched the program, the California method was looked upon with favor.

During the winter studies were made at Fort Collins on permanent wilting point and moisture equivalent, or water-holding capacity, of these soil samples, under the direction of Robert Gardner, Associate Agronomist, Colorado Experiment Station.

MEANWHILE, Henry W. Dahlberg, Research Manager of the Great Western Sugar Company, had come to the conclusion that the so-called Bouyoucos method for measuring soil moisture under field conditions had certain advantages over the procedure used in California, and this method, developed at Michigan State College, was adopted in the spring of 1940.

In April S. B. Nuckols, Associate Agronomist, Scottsbluff Experiment Station, Mitchell, Nebraska, also favored the Michigan
Another advance of the machine age over horseback irrigation methods is illustrated by the above device used on more than 1,000 Colorado and Nebraska farms this summer in a program to improve irrigation methods. By means of a high-frequency circuit, which gives signals in the earphones, Charles Clay, Greeley Fieldman, is able to “tune in” on soil moisture—eliminating guesswork as to timely need for water and the amount to be applied for normal plant growth.

method over the California method and launched a comprehensive cooperative experiment with the Company in Nebraska with hundreds of plots. Norman Muscavitch, Chief Chemist at Scottsbluff, has devoted practically his entire time to the work.

The object of these experiments is three-fold:

1. To learn how little moisture a plant can receive and yet survive and produce profitably.
2. To learn the amount of water that should be applied in each irrigation and the frequency of irrigation.
3. To learn if it would be practical for farmers to use scientific devices for measuring moisture.

Final records on the tests made this year have not been completed, but preliminary findings indicate clearly that the work has been significant and that farmers themselves are deeply inter-
ested in seeing it continue. That the program will be extended in 1941 is certain.

The Bouyoucos, or Michigan method for measuring soil moisture, uses the principle of measuring electrical resistance caused by more or less moisture in a porous block imbedded in the soil. The moisture content of the absorbent material varies with that of the soil. Its electrical resistance varies inversely as its moisture content.

Absorption blocks are made of plaster of paris. A portable alternating current bridge, operating at high frequency, has been devised to measure the resistance of the blocks. The apparatus measures the available moisture in the soil. Its sensitive range includes all of that soil moisture between the wilting coefficient and the field capacity.

Field studies have shown that this method is convenient and rapid. After the blocks have been installed only a few seconds are necessary to determine the block resistance.

Four blocks are imbedded in each field, two at the upper end of the irrigation run, 18 inches and 36 inches deep respectively, and two at the lower end of the run, the same respective depths.

Equipment for the 1940 experiment was furnished by the Company, and in the Colorado district the readings were taken weekly by Company Fieldmen.

**Why Rosebud County Beet Growers Turned to Lamb Feeding**

*By FRANK BARNUM*

*County Agricultural Agent, Forsyth, Montana*

FACED with an uncertain market for their feed crops and a diminishing supply of manure to apply to their Montana beet land, eleven Rosebud county beet growers turned to lamb feeding as a solution to these problems.

These farmers not only marketed their feed crops at a good price and provided a good supply of manure for their beet land, but made a reputation for themselves and the district as a place where "trade-mark" lambs are produced. Practically every car of the forty-five cars of lambs fed and shipped, sold at the top of the market at South St. Paul, where most of them were marketed.

Live stock feeding had never been practiced to any extent because formerly the valley provided a winter feed base for range operators, using the grazing lands for a hundred miles or more on either side of the river. These range men provided a ready market for all feed produced by the farmers in the valley, but a series of drought years and low prices caused liquidation of a substantial percentage of their range stock, so that they no longer provided a market for all of the feed produced.
Note trim appearance due to "tagging" tails and faces when lambs first come to the feed lots. These market-topping lambs on the Walter Knutson farm, Forsyth, were fattened on corn, dried pulp, beet tops and alfalfa.

After carrying over one or two years' feed crops, it was only natural that farmers in the Forsyth district should turn to live stock feeding as a means of marketing their feed, as has been done in most of the other beet growing areas.

As LAMB feeding fits in well with beet growing operations, and a good supply of feeders was available in the adjacent range territory, it was comparatively simple for these farmers to make a start in lamb feeding.

A large percentage of the lambs were received within trailing distance of the farms where they were to be fed. All lambs were received between October 1 and 10, and averaged from 65 to 70 lbs. The number per feeder varied from 500 to 1500; the eleven farmers feeding a total of 11,000 head.

On arrival at the feeder's farm, the standard method of management was to allow the entire bunch to run on beet tops and stubble fields with plenty of alfalfa hay being fed in the corral at night. After approximately thirty days on tops, the heavy end of the lambs was shut up and put on a self-fed ration consisting of dried beet pulp and oats 50-50 by weight; about two weeks being required to get them on a full feed of approximately two pounds of this mixture per day. The lighter end of the lambs were allowed the run of beet fields, stubble and corn stalks until all feed was cleaned up, after which they followed the heavier end into the feed lots.

As each bunch contained a number of so-called "heavy" lambs or lambs weighing 80 pounds or more, it was necessary to finish this group as quickly as possible. As evidence that the feeders were successful in finishing the heavy end of their lambs before becoming too heavy, not a car load of lambs shipped from this territory was penalized for over-weight and every car load shipped sold at the

(Continued on Page 190)
WENDELL L. WILLKIE visited the beet farm of Mr. and Mrs. Emil J. Ehlen, about 4 miles south of Brighton, Colo., July 19, following a visit to the Brighton sugar factory. The press quoted Mr. Willkie as saying:

“I am tremendously interested in the beet sugar industry. I appreciate the fact that it is one of the basic industries for the farmer and worker in this part of the country. I am trying to get all the information possible so that I can understand clearly the problems of the industry.”

The center picture (Pictures, Inc.) shows Mr. Willkie chatting with the Ehlen family in their garden, left to right: Mrs. Ehlen, Maxine, Mr. Willkie, Marcia and Mr. Ehlen.

The upper left and right photographs were taken in Mr. Ehlen’s beet field, and the lower left in the feed lot. Mr. Ehlen feeds every month in the year.

The lower right (Acme Photo) shows the presidential candidate in the laboratory at the Brighton factory. He was a sugar chemist 26 years ago in Puerto Rico and at one time had worked in the beet industry near Fort Collins.
Here are 1300 lambs fattened by Alidor Buyse at Finch. This was Mr. Buyse’s first attempt at lamb feeding and was entirely successful. He will feed lambs again this year.

Why Rosebud County Beet Growers Turned to Lamb Feeding

(Continued from Page 187)

top of the market on the day they were sold.
Lambs from each feed lot were sorted as they were finished; the first car load from the area being shipped on November 23, and the last on April 1.

THE success of lamb feeding operations in the Forsyth area can be attributed to the following ten-point program worked out in advance of the start of feeding operations:

1. Adequate feed lots prepared in advance, including ample feed panels, grain troughs and watering facilities.
2. Dried beet pulp to make up not less than 40 per cent of the grain ration at all times.
3. All big growthy lambs to be finished as rapidly as possible in order to be marketed before becoming too heavy.

4. All lambs to be tagged (sheared around tails and faces) on arrival at the farm.
5. All lambs to be carefully sorted and shipped at or near the proper weight and finish as possible.
6. Good alfalfa hay or other dry feed to be before the lambs at all times, particularly when they were on beet tops.
7. Plenty of bedding to be used in corrals to insure a dry lot, clean lambs and a maximum amount of manure.
8. Regular hours of feeding.
9. No corn stalks or fodder to be used in feed lots as roughage.
10. Plenty of salt and bone-meal kept in front of lambs at all times.

It must be remembered that only three of the eleven feeders had had any previous lamb feeding experience, and these had only one year.
DRIED beet pulp was recommended in the ration because experiments conducted for a number of years by the Montana Agricultural experiment station had definitely proven that it was worth more than grain, pound per pound, when used up to 50 per cent of the ration. Furthermore, these experiments had also proven that where dried beet pulp made up half the grain ration, there was little danger of over-feeding. This safety factor alone was considered to be very important, especially with inexperienced feeders. The wisdom of this requirement was later proven by the small death loss experienced, the average for all eleven feeders being less than 1½ per cent, with the highest loss being less than 3 per cent, and a low of less than ½ per cent.

Several of the lamb feeders are now planning on using self feeders this year, in which will be fed a mixture of oats and dried beet pulp, 50-50 by weight, gradually adding a little ground corn as the feeding period advances. This was proved to be highly practical last year by Ralph Nipple, one of the local feeders, who kept self feeders in his lots from the day the lambs were received. Having access to the grain mixture at night while in the corral, the lambs gradually consumed more grain as the beet tops were cleaned up. His final figures showed the highest rate of gain (slightly over three-tenths lbs. daily) as well as the lightest death loss for all of the eleven feeders.

Farmers, as well as the business men, now have confidence in the lamb feeding business. Last year's experience has taught them that this enterprise can be intensely interesting, as well as profitable, when careful attention is paid to details. Few of them expect to make a big profit every year, but most of them figure it to be an important enterprise to be carried on in connection with growing beets, in which way it will provide a market for their feed crops, manure for their beet land and a substantial profit over a period of years. All of us have learned a lot from last winter's experience and are determined to maintain a reputation for the area as one where "trade-mark" lambs are produced.

HERE is Frank Barnum, Rosebud County Agent, the author of this article. Mr. Barnum encouraged and supervised the fattening of 45 cars of lambs in Rosebud county the past year. Practically every car topped the market and returned a profit ranging from 50 cents to $1.50 per head. Lamb feeding has come to stay in this area, according to Mr. Barnum, because it has proved the best answer to the problem of uncertain markets for feed crops and diminishing supplies of manure.
IN MANY regions the loss of water in transit from the source of supply to the farm is appalling. During recent dry seasons, on one irrigation project with a water supply below normal, two-thirds of the water released from the reservoir was lost in transit. These water conveyance losses are generally described as seepage and evaporation. A more comprehensive description would be seepage—losses by water percolation, evaporation—losses from the water surface and ground surface of the banks, and transpiration—the water given off by the plants growing on the banks of river, reservoir, canal, or equalizer. Here attention is especially directed to transpiration water losses, which are often overlooked.

That weeds and trees along water courses may consume and transpire considerable amounts of water is indicated by recent studies of the consumptive use of water. Research by the United States Bureau of Agricultural Engineering shows that tules and cattails under favorable conditions can use about 8 acre-feet of water per acre in one growing season. In experiments conducted at Davis, Calif., it was found that a single wild morning glory plant in a tank, took from the soil and gave off by transpiration 4 cubic feet of water in 144 days and that a prune tree, only 4 years old, used by transpiration 20 cubic feet of water in one season.

Climatic conditions, of course, play a part in the amount of moisture given off by transpiration. For example, the amount of water used by transpiration to produce a ton of alfalfa is not the same in Arizona as in Montana. And naturally a large tree would use much more water than a tree a few feet high.

Studies of canal water losses by one of the state experiment stations revealed that over a 10-year period the average water conveyance and delivery losses for all irrigation canals in the state increased 40 to 60 per cent. During this period the new growths of trees along the water courses and the weed infestations on the banks undoubtedly increased considerably and it is safe to assume transpiration water losses contributed to this large increase in water losses.

Another striking example of water losses by transpiration was observed recently on an irrigation project. During the early period of project operation an irrigation canal about 15 miles long delivered ample water for the acreage it served. But from year to year the amount of water delivered to the farms decreased even though the same quantity of water was diverted from the river. Careful water measurements showed that there were excessive water losses through the reaches of the canal where large cottonwood trees were growing on the ditchbanks and at a considerable distance from the canal. After trees were removed, the original water supply was restored. It pays to have careful water measurements made to locate places of excessive water losses in a project irrigation system.

Water-loving weeds, willows, and other trees growing on the canal banks and in the water retard the flow of water and reduce the carrying capacity of the canal, often making it necessary to use the free board capacity of the canal and sometimes to push
No. 1 - Tules in a lateral before cleaning.
No. 2 - Same lateral as in No. 1 after cleaning.
No. 3 - A cleaning machine completing a round trip moving silt and plant growth.
No. 4 - Another machine that moves silt and weeds from both inside slopes of a canal in one operation.
No. 5 - Brome grass, a weed competitor, not seriously injure in cleaning canals.
No. 6 - A new growth of brome grass.
No. 7 - Brome grass on ditch banks serves dual purposes.
the water over the weeds. Weeds growing in the water consume and transpire far more water than is lost from the water surface by evaporation. View No. 1 shows a lateral with a heavy growth of cattails. Transpiration water losses in this lateral are high. View No. 2 shows the same lateral after cleaning. Note how cleaning has removed all of the water-wasting cattail.

In views 3 and 4 you see modern cleaning machines in operation, removing silt and weeds. This equipment leaves the canal with a smooth surface thus reducing the coefficient of roughness.

Good management of an irrigation system requires keeping the banks of reservoirs, canals, and laterals free from useless plants, which consume valuable water and also may contribute to seepage water losses. Deep-rooted plants like sweet clover, wild morning glory, and willows not only pump water out of the moist soil, and indirectly from the canal, but also loosen the soil in the canal banks, thus increasing the seepage losses. And weeds along the banks of any water course drop their seeds into the water to find easy transportation to farm ditchbanks and fields.

What should be done to keep transpiration water losses along canals to a minimum? Except where trees are needed for shelter and windbreaks, banks should be cleared of willows, cottonwoods, weeds, and similar useless growth and their moist areas planted to shallow-rooted, hardy, weed-competing grasses.

Establishing aggressive weed-competing grasses on ditchbanks is not difficult but like planting seed in a field, there should be the proper seed bed and ample moisture. A seed bed, comprising a narrow strip about a foot wide just above the high water-mark of the ditch, should be carefully prepared. The inside slopes of ditchbanks are kept moist by the side movement and capillary action of water from the canal. Often, too, the outside slopes and even the soil some distance from the canal may receive enough water to permit plants to grow. Generally the grass seed should be planted in early spring though in some localities late fall seeding will give the best results.

View 6 shows a small lateral with a good stand of young brome grass as it looked in the summer of 1939. These banks in 1938 had such a heavy growth of annual and perennial weeds one could scarcely see the water in the lateral. The weed growth was removed and a good seed bed prepared. Then late in the fall, when it was too cold for seed to germinate, the banks were seeded to brome grass. It is not necessary to seed the banks the entire length of the ditch. A good plan, especially if only a limited amount of seed is available, is to plant the upper ends of all ditches on a project. These small patches, with their roots creeping out to enlarge the area and with the maturing seed spreading by winds and water, in a few years will seed not only the right-of-way adjacent, but also considerable areas of ditchbank downstream.

Such a self-seeded lateral is shown in No. 7. From one side of this right-of-way to the other, except for the area where water is run, there is a solid mat of brome grass. No part of this right-of-way was ever seeded to brome grass by man. But up the lateral a short distance a farmer had seeded his ditchbanks to brome grass. The seed from these upstream plants,
traveling with the water, seeded the moist area of this ditchbank. Spreading from the water’s edge over the top of the ditchbank, this sturdy grass now covers the entire right-of-way.

A well-established stand of brome grass on a ditchbank is not seriously injured by the material placed on the bank during cleaning operations. View No. 5 shows a ditchbank with a small ridge of bare soil thrown up by a ditch-cleaner. If brome grass will not take root on this newly placed soil neither will the weeds.

Brome grass and other aggressive grasses on rights-of-way serve dual purposes—control weeds and provide valuable supplemental pasture. Except on those projects where canal water is used for domestic purposes, the right-of-way should be fenced and used to pasture live stock. As the grasses are planted to keep out weeds, it is important not to allow overgrazing. Also, if the ditchbank material is such that it moves easily by trampling into the canal section, only sheep, calves, and other small live stock should be grazed on the ditchbank. And like the care of any other pasture, ditchbank pasture should be mowed at timely intervals to prevent the maturing of any weed seeds.

Weed-competing grasses consume a relatively small amount of water compared with weeds, willows, and other useless growths and pay dividends in controlling weeds and providing valuable feed for live stock. Conserving water by preventing transpiration water losses from useless plants is conserving an agricultural resource for present and future use.—The Reclamation Era, June, 1940.

BUILDS UP HIS HERD

Here is Henry Lehman of Bridger, Nebraska, who in the past five years has built up his own farm flock of cattle consisting of about 45 head. Mr. Lehman has used pure-bred Hereford bulls to sire his flock. Mr. Lehman says, “I realized that if I was going to stay in this farming business and succeed I simply had to produce fertilizer for my land. Now I found that I not only get the fertilizer to grow better crops, but I also have developed my own home market for all the feed crops I produce, and most important, I find I have developed another indispensable source of cash income.”

Gus Gremel was among the early birds on fall preparation in the Brighton district this year. Gus grows pickles, beans and beets in rotation. Over the past 10 years he has averaged 35 acres of beets a year with an average yield of 14.81 tons—a very fine record considering the dry years. His beets usually have a high sugar content, 18 per cent or better.

Among the Fort Collins growers who have recently dug or are now digging irrigation wells are: W. A. Scott, Clovis Nelson, Ora Zenor, J. R. Bay, I. M. Watts, all of Timnath; J. J. Ver Straten of Harmony, Vic Akin of Giddings and Carl Weiss of Kluger. Some of the wells are finished and now producing.
Tour of Sugar Beet Experimental Work Held in North Platte Valley

A TOUR of inspection of the sugar beet experimental work being conducted this year in the North Platte Valley was held August 23 and 24. The tour was sponsored by S. B. Nuckols and E. S. Lyons of the Office of Sugar Plants, U. S. Department of Agriculture; Lionel Harris, U. S. Department of Agriculture, Scottsbluff Experiment Station; Leon Paules, University of Wyoming State Experiment Station, Torrington; The Great Western Sugar Company, and the Holly Sugar Corporation. The tour was attended by about 90 research workers, sugar company representatives, county agents, growers, growers’ association representatives and agriculturists. Nearly all beet growing areas on the eastern slope were represented.

At the Wyoming State Experiment station, west of Torrington, plots showing the effect of early planting and rotation on the control of root knot nematode were examined. The marked improvement of the early planted plots in the root knot infested ground over the late planting indicated the possibilities of reducing root knot damage by early planting, according to Mr. Nuckols who explained the work being done. Planting dates ranged from March 20 to April 30.

The Holly Sugar Corporation factory farm was visited to inspect some fertilizer experiments being conducted by Mr. Nuckols. The purpose of these tests was to show the effect of manure and phosphate on beets and the residual effect on corn.

Seed variety plots were visited. There were 100 different plots. Different varieties of seed were being tested and checked for yielding ability and resistance to various diseases. This work was conducted under the supervision of C. E. Cormany and Charles Harris of the Holly Sugar Corporation.

ON THE morning of August 24, an irrigation experiment on one of the Great Western Sugar Company farms was visited. This experiment is being conducted to determine the practicability of determining moisture content of the soil and moisture requirements of beets by the use of plaster of paris blocks. This method is described elsewhere in this issue in an article titled “Tuning in on Soil Moisture.”

On this same farm variety tests being conducted by The Great Western Sugar Company were explained by Dr. H. E. Brewbaker. Twenty varieties are planted in these plots. The purpose of this work is to develop types of seed adaptable to the different territories in which the company operates and types resistant to different beet diseases.

The Henry Drumheller farm was visited to observe some fertilizer tests being conducted by Mr. E. S. Lyons. Different types and amounts of fertilizers were applied to the various plots.

At the next stop Mr. Lyons explained the work he is doing in an attempt to find a practical method of reclaiming for cropping purposes the slick, impervious clay spots which appear in some fields and which will produce nothing. This soil is sometimes referred to as soda clay. The spots were treated with various chemicals such as gypsum, calcium chloride, and sulphur. Although the work is yet in the preliminary stages, the
Working for higher yields of sugar beets! The lower picture shows scientists of the U. S. Department of Agriculture sponsoring demonstrations of experimental work in the North Platte Valley; left to right: Leon Paules, University of Wyoming State Experiment Station, Torrington; E. S. Lyons, Office of Sugar Plants, U. S. D. A.; Lionel Harris and S. B. Nuckols, Scottsbluff Experiment Station. In the upper picture Mr. Nuckols, extreme right, is discussing one of the irrigation demonstrations.
sulphur treatments resulted in a marked improvement in the physical texture of the soil.

A STOP was made at a field which is part of Mr. Nuckols' program for developing new seed varieties. The beets in this field were spaced 36 inches apart. The purpose is, as far as possible, to eliminate or reduce competitive growing conditions between individual plants. From these beets breeding stock is selected.

The last stop of the tour was made at the Scottsbluff Experiment Farm. Here the group studied the rotation plots which were explained by Lionel Harris, Director of the farm. The rotations on these plots have been carried on for 29 years. The plots are under both long and short rotations, with and without the application of manure. Some include the substitution of sweet clover for green manure and pasture purposes. Some include alfalfa. The yield figures of the different crops under the various cropping systems are very striking and clearly point to the benefits to be gained from proper rotations and the necessity of applying some kind of fertilizer in order to maintain high yields.

The tour demonstrated the large amount of valuable experimental work in sugar beets that is conducted every year in the North Platte Valley both by government agencies and private interests. The purpose is to improve the type of seed and develop better cultural practices. The ultimate end of all this work will mean higher yielding sugar beet crops.

Nebraska Farmer Grinds and Siloes Tops
By LYNN PITCHER

THE method used by Paul Blood, Lyman, Nebr., beet grower and sheep feeder, to obtain maximum feed value from his beet tops will be of interest to others. His is a simple and economical way of preserving all of the food value in the tops for winter feeding. His experience has been that to enable old ewes to utilize all of the food value of the tops, they must be ground and he has found the following to be an excellent method of preserving the tops for feeding to both ewes and lambs.

In 1939 two pits, one 125 feet long, 12 feet wide and 6 feet deep, and the other 150 feet long, 14 feet wide and 10 feet deep, were dug before harvest in order to provide storage space for the tops. The first pit was prepared to take care of production from 52 acres and the second for production from 82 acres.

During harvest and immediately after, the green tops were ground in a Papec feed grinder. Mr. Blood finds that green tops are easier to put through the machine than dried ones. Every effort is made to grind the tops before any dirt or sand has been blown into them. Since a loss of feed value results from leaving the tops in the field, plans were made to grind them within ten days of piling.

WHILE the tops were being ground into the pits, a Farmall rubber tired tractor was kept running back and forth in them to pack the tops as solidly as possible. After the
pits were filled a two-foot layer of pressed pulp was thrown over each of them.

In transferring the packed tops to the feed pens, it was found the use of a hay knife to cut out the feed by sections made it easier to handle with forks. In other years when dried tops were fed there was considerable wastage, but the grinding and packing made it possible for the 2000 lambs and 3200 ewes fed to eat every bit.

Most of the contents of the pits was fed last winter and spring and it was not necessary to discard any of the tops due to mold. The last of the sheep were shipped in May and a small quantity of tops remained in one of the siloes. This fall this pit was examined and it was found that the spoilage was negligible and no appreciable amount will have to be discarded.

The total cost of siloing tops per acre of 16 to 18 tons beets amounted to approximately $4.50. Mr. Blood expects to cut the cost this year by grinding the tops into trucks in the field. This will be accomplished by rigging up the power takeoff on the tractor so that it will run the grinder. The grinder will be pulled along the pile rows by the tractor and two men on the ground will fork the tops into it. The grinder will expel the ground tops directly into wagons and trucks for transportation to the silo, since the wagons and trucks will run into the pits for dumping, the ground leaves will become well packed and thus the necessity of running a tractor in the pit for this purpose will be eliminated.

SINCE he estimates that this method of preparation at least doubles the feed value of the tops, Mr. Blood intends to grind production from his entire acreage this fall. In comparison with current corn prices he estimates the feed value of the ground tops to be between $30 and $35 per acre.

The ration used in feeding the lambs is 2½ pounds ground beet top ensilage per day in the morning, 2½ pounds mixed corn and cane ensilage at noon,
and alfalfa hay fed at night. One-fifth pound of corn and whole mixed barley are fed at the beginning of the feeding period and this amount is gradually increased until it reaches one pound per day. A mixture of concentrate and ground beans is gradually increased to one-fifth pound per day. Three weeks previous to shipping the lambs are put on self feeders which are filled with the grain ration, dried molasses beet pulp, concentrate and ground beans.

The ewes are fed the following ration: Twelve pounds pressed pulp with Johnstown molasses per day, 5 pounds ground beet top ensilage and one-half pound bean straw.

### Breaking the Sod—And Building It

*By J. E. FACER*

Since the beginning of farming and irrigation in the West it has been common belief that newly-broken prairie sod or virgin soil would produce better crop yields than land which had been under cultivation for a longer period. Such a belief is far from the truth in the well-farmed sugar beet growing districts. The farming operations of Pedroni & Giacomini, which concern owns and manages 14 farms in the Sterling district, indicate the constant improvement which is taking place in beet growing areas.

In 1894 Tom Pedroni, who was then farming and raising cattle in Stanton County, Nebraska, realized the opportunities for cattle raising and farming in eastern Colorado along the Platte river. A few years later Anton Giacomini came from Nebraska. These men formed a partnership, purchased some range land and leased other tracts for grazing. In 1903 a large tract of river bottom land, adjoining the present location of Ford station, was purchased. The present irrigation system of the Sterling No. 1 Ditch was being developed to irrigate land under this purchase.

By 1908 the Sterling factory had begun operations and as a result the Pedroni and Giacomini land was divided into three farming units and gradually broken from the sod. According to Mr. Pedroni, now in his eighties, seven or eight tons of beets to the acre was the first year's harvest in 1908. Eight- to nine-ton crops were the rule even until 1920.

More land was acquired by 1911 when the North Sterling reservoir began delivering water. Gradually additional farms have been purchased until the present 14 farms, which represent an average of Sterling district conditions, were under their ownership by 1937. Parts of some of the later purchases are now being reclaimed from dry land and idle tracts.

It is significant to notice that the average yield of beets on all Pedroni and Giacomini farms for the 10-year period 1930 to 1939 was 12.95 tons per acre, compared to 10.52 tons per acre for the 10 years 1920 to 1929.

For the past eight years these farms have been under a rigidly supervised eight-year rotation. The sequence of crops in this rotation is: grain and new alfalfa seeding, alfalfa four years, beets, grain, beets. Manure is applied to both beet crops. This rotation has proved flexible enough to produce two
Farming is a business on these 14 farms, operated with uniform feeding and rotation systems. (1) The management insists on fall plowing and gets it done. (2) Ed Giacomini, left, supervises livestock feeding operations and Frank Giacomini manages the farming end. (3) Manure is spread in the fall as it should be on well-managed farms. (4) A fine stand of alfalfa secured this year on one of the farms by Joe Gertner; and (5) John Schneider, who always fall plows on a North Sterling Pedroni-Giacomini farm.

crops of beets in succession in order to maintain beet acreage during years when drought and grasshopper infestation have destroyed new alfalfa seedings.

Even though some of the Pedroni and Giacomini farms have several rolling and sloping fields, that fact does not exclude them from the rotation plan. This plan provides for an annual beet acreage of 25 per cent of the total cropped acreage.

Extensive fertilizing of all land planted to beets with a 10- to 15-ton application of manure began in 1935. Previously, tenants were doing some
feeding and securing some manure elsewhere. The present plan for supplying manure for all beet acreage on these 14 farms is unique and most practical. At a central feedlot, Pedroni and Giacomini annually feed 4,000 to 6,000 lambs. Ordinarily four or five car loads of cattle are also fed at this location. Each tenant is assigned a feeding pen which he is to keep supplied with straw. He, in turn, receives the manure from this designated pen. In the event that the amount of fertilizer in a tenant’s feeding pen is not sufficient to cover his proposed beet acreage, manure is purchased to take care of the deficiency. In addition, several tenants are feeding cattle and another is a sheep feeder. The land owner has often fed live stock on a partnership basis with tenants.

Fall preparation of land is of prime importance in this rotation and fertility program. Wherever possible fall-plowed land is fall-irrigated. Indications are that all 1941 beet acreage on Pedroni and Giacomini land will be fall plowed. Crop yields for the past five years well emphasize the results secured from this well-executed rotation and fertility program. On an average beet acreage of 511 for the five years 1935 to 1939 inclusive, Pedroni and Giacomini farms have produced an average yield of 14.33 tons of beets per acre. The Sterling district average shows 12.99 tons for the same period. The same consistent increase in grain and alfalfa yields has also been very evident.

Following the crop through! A group of Brighton 4-H Beet Club boys on an August tour of inspection of the various projects, left to right—Donald Dreyer, James Green, Ray Green, Henry Mancini, Herman Schwab, Herbert Gremel, Harold Stockton, Jr., and James Diamond.
Progress in Sugar Beet Machinery

H. B. WALKER
Agricultural Engineer, University of California

At the spring meeting of the advisory committee, American Beet Sugar Association, held at Davis, California, on June 3-4, 1940, the committee urged the investigators to do everything possible to complete two harvesting units for field trials by October 1, 1940. These units were to include toppers of the variable-cut type, lifters of suitable type for the pick-up mechanisms used, and one each of these harpinger pick-up mechanisms, (a) finger picking mechanism, with Reinks screen, hand sorting table and bin arrangement, and (b) a vibrator lifter unit with elevator equipment and bin, if feasible.

Since the June meeting further field tests have been made with certain elements of these proposed machines in the Imperial valley.

The variable-cut topper which was designed with a heavier knife mechanism was tested early in July and the top-disposal apparatus was found to be satisfactory. The sturdier knife mechanism, however, involved the use of a heavier slug to produce the desired vibrations and the drive shaft to this element of the machine soon failed due to the forces set up in the frame parallel to the direction of travel. These forces overloaded the drive mechanism due to the high power requirement for rotating the slug.

The lateral movement of the knife, or the desired motion to be secured from the slug action, was satisfactory so correction of the trouble had to be obtained in damping out the longitudinal vibration.

This called for the design of a compound slug mechanism which maintains the lateral vibration, but which neutralizes the linear vibrations. This new slug has been designed and construction is nearly completed. This difficulty has delayed our program considerably, but there appears to be no important mechanical troubles standing in the way of the early completion of the unit. Furthermore, castings and parts have been secured, or are on order, for a second unit of this topper.

The recommendations of the committee did not include further work on a disk topping device of the Devey type. The research workers, however, felt the performance of this unit in weedy fields was sufficiently good to merit its inclusion in the program. Furthermore, it is a relatively simple unit, which can be used interchangeably with the variable-cut unit so that comparative field tests can be made readily. During periods of "fill-in" shop time a second unit of simplified design has been built for elemental field tests.

The May tests in Imperial county, California, with the vibrator lifter following the Colorado-type digger were very promising, but it was found the compound crank system used to produce a vibrating motion to the V-type lifting mechanism was too weak and it failed structurally in these tests. Since weight of the vibrating part and speed of rotation are important factors in design, it was
thought possible to use a single drive crank with a reciprocating swing action at the free, or forward end of the V member.

This design was tested in Imperial county early in July under very dry, hard soil conditions with negative results. It is apparent this type of design is impractical and our studies must be centered about the compound crank system which is difficult to design for successful operation under farm field conditions. This test also showed that the Colorado lifter is entirely ineffectual in combination with the vibrator for such soil conditions as prevailed during these tests. Water had been drawn from this sedimentary clay land about sixty days previous to the test and the intervening weather was dry and hot (95-115° F.). It seems advisable, therefore, to try to incorporate a more universal type of lifter with this mechanism, although under intermountain conditions the Colorado digger may be satisfactory in a combination with the vibrator lifter.

While it seems certain the vibrator lifter can be tested elementally in the test areas (Colorado, Idaho, California) this fall it is doubtful if this unit, which was first conceived less than a year ago, can be successfully incorporated in a field unit by October 1st. However, designs are being worked out and shop work is under way.

The combination digger and finger lifter tested for the first time under actual field conditions in Imperial county, California, in May, 1940, while lacking in many ways of meeting the requirements of a complete harvester, has considerable promise as a labor reducer. It can successfully loosen topped beets, it can be held on the row, and the finger mechanism engages the topped beets and lifts these from the ground. Unfortunately, however, some of the clods are picked up which must, in some way, be separated from the beets. The quantity of soil lifted with the beets is much less than with the usual point type elevator lifter but still far too much for practical harvesting.

To further test this unit, and to find out if it can be used in its present form in a harvesting system with a ground topping device, the unit is now being equipped with a Reinks screen and a sorting table attachment to hand separate the topped and lifted beets from the clods. This arrangement, if it shows promise, can readily be incorporated into a complete harvesting combination which in its elements includes a ground topper, lifter plow, finger pick-up, Reinks screen, sorting table, elevator and bin. This unit should be ready for initial field tests in about two or three weeks.

Some changes are being made on the Scott-Viner harvester preparatory to field trials this fall principally in Colorado.

At the Colorado station a field loader is under construction for use in that area with both hand and machine harvesting work next October.

In connection with Dr. Brewbaker's article in this issue is shown a photograph of Sylvester Soucie, tenant on one of the Haley-Smith farms, Sterling, with a disc hooked to a binder. Sylvester used a heavy 10-foot chain hooked from an angle iron under the platform of the binder, through clevis on disc, forward to eye above pitman, and then fastened to the hitch between tractor and binder, according to E. S. Willis, Fieldman.
Some Figures on Running a Loader

By JOHN STEWART

P. MILLER, who operates his own farm of approximately 280 acres at Kirkland station east of Longmont, is thoroughly satisfied with the manure loader he has for his farm. This loader was built by J. G. Reisig of Farmers Spur at a cost of $145.00 for use on a C. C. Case tractor. After keeping record of costs of hand loading and spreading manure on his farm and comparing them to doing the same jobs with the use of his new loader, Mr. Miller has found that he can now do the work for half the cost of the old way in less than a fourth of the time.

In loading and hauling manure (not including the spreading) from a feedlot five miles away from his farm, four of his men could get about seven truckloads containing five eighty-bushel manure spreader loads per day. With the use of the loader, the same number of men are able to get thirty truckloads per day. For this work in the hand loading, the labor cost per truckload was $1.00 to $1.14; while in using the loader the total labor cost plus gas, oil, and depreciation for the loader amounted to about 32 cents per truckload.

In getting the manure out of the feedlot on his own place and spreading it on the field, it formerly cost Mr. Miller about 26 cents per spreader load for labor cost where hand loading was used; with the loader it now costs about 12 to 13 cents per spreader load, including the labor cost plus gas, oil, and depreciation for the loader. In the latter case the loader was used to load the trucks in the feedlot, and again for loading the manure spreader in the field from the piles dumped out of the trucks after the manure had all been hauled into the field. The "scoop" of the loader is small enough so that it breaks up the manure fairly well when it dumps into the truck or spreader; yet it is sufficiently large to load rapidly. It takes about ten minutes to load a large truck in the feedlot.

Last year in a thirty-four-acre field it took four men twenty hours with three spreaders and the loader to cover the entire field after the manure had been hauled out into the field and piled.

The fact that he can get his manure out earlier and plowed under, and done at considerably less cost is satisfactory proof of the value of the manure loader to Mr. Miller.

J. F. King, Joyce Station, Lyman, completed an irrigation well the first week in August and had it quickly in operation. It delivers about .5 of a foot of water. The well is 24 inches in diameter and 57 feet deep.

Harold Webster of Harmony, Fort Collins, has just finished a trench silo.
Experience in Manure Conservation

By C. H. WILMERDING

In Hoard's Dairyman

Average yields of certain crops in European countries have increased 30 per cent to 60 per cent in the last 40 years and are two to three times average American yields. One of the causes is the methodical restoration of both solid and liquid animal manures to the soil. On the writer's small tenant-operated farm in Illinois we have tried to devise a method for accomplishing the same result that American farmers can use in spite of their greater acreages and less help.

Our experiments have been conducted with the technical assistance of Dr. Victor Conquest, head of the chemical research department of Armour and Company, and are based on a natural aerobic digestion process which conserves, and perhaps even increases, the manure's fertilizing properties. The process and our method of handling differ from the usual European. This article summarizes and supplements with practical experience my previous article on the theoretical aspects of the problem that appeared about two years ago in Hoard's Dairyman.

In Europe the liquid is usually kept in a closed underground vault, separate from the solids, requiring an elaborate drain system in the barn and a pump, all of which are costly. We have no underground vault but we do have a single open-air concrete pit just outside the barn, and the liquid and solid manures, bedding, and barn clean-up water all go into it together. After a few days they begin spontaneously to produce some interesting and valuable chemical-bacterial reactions.

Apparently most of the free ammonia, which contains the valuable nitrogen, is fixed by contact with the carbon dioxide from the air in solution in the water, and remains in solution in the water as a less volatile compound. After a few days bubbles of carbon dioxide form on the submerged solid matter mixed with straw, and float it to the surface where it forms a crust which tends to seal the ammonia compound against evaporation. (This continuous flotation process facilitates handling by skimming as described later.)

Dr. Conquest's analyses show that little of the ammonia is lost even after several weeks' exposure to summer sun. As the ammonia is saved there is little of the characteristic manure odor, but rather the rotten egg odor of hydrogen sulphide predominates. It is too mild to be noticed more than a few feet from the pit, but seems to repel flies, as only a few are observed. Of course the phosphate and potash also are saved, instead of leeching off into the barnyard as they largely do in the usual manure pile.

The solid manure and straw bedding in the pit are well on the way to decomposition in about two weeks, and spread on the fields finely and evenly. The crop results from two years' application to poor soil seem to support Dr. Conquest's preliminary opinion that the hydrogen sulphide is present in sufficient quantity to break down some partly decomposed rock particles (called "m a g m a") into plant food, thus creating additional fertility.
Extended studies by Ohio State University show that “unless safeguarded, manure will lose fully one-half its crop-producing strength before reaching the soil” (Bulletin 131, July, 1935.) With the crop-producing strength safeguarded by the digestion process as the chemical analyses show, a cheap and easy method of handling the products can make important contributions to soil conservation.

Our tenant, Paul Sowers, calls our method “the lazy man’s way of handling manure,” and considers it easier than the old pile-and-pitchfork. The gutters behind the animals are trowelled smooth, and slope toward the pit. The solids are pushed easily with a fork down the gutter through a small opening in the foundation into the pit, and of course the liquid manure and clean-up water follow by gravity. The pit has a capacity of 50 cubic feet per animal. We always keep enough water in it to float the solids as they rise to the surface after about 10 days due to bacterial action.

In our case we do not remove manure from the pit oftener than twice a week when the cows are stabled in winter. The 50-cubic feet of pit capacity per animal gives considerable latitude in removing the manure and apparently the solids do not deteriorate much even when the bacterial action causes them to float to a considerable depth in the water. One of the advantages of this method is that it is not necessary to spread manure every day but, within reason, to do so when convenient and without loss of fertility elements.

Our principal mechanical equipment is a bucket of the ordinary lever-hoist, litter carrier type. However, the bucket is provided with a 3” hole in the bottom and a long-handled wooden plug to fit; a ¾” wire mesh with a corresponding 3” hole is fitted inside the bucket and held away from it to permit drainage; a similar removable mesh but without a hole is fitted outside; small hoisting cables are substituted for the standard ¾” ones and are wound on only one of the hoisting drums, and the other hoisting drum is built up to give leverage and is fitted with a cable for horse operation. These changes do not in any way impair the litter carriers’ use for its original purpose, nor its operation by hand power.

The bucket is lowered from the track over the pit and partly submerged. (There is no reason why the same bucket cannot be used for conveying the solids into the pit. It might be more convenient in a large operation than pushing them down the gutter.) The operator stands in a hole about a foot deep just outside of the pit, pulls the floating solids toward him with a rake or fork, raises them a few inches with a short grip on the fork, and drops them into the bucket. When it is filled a block is inserted in the track to hold the carriage stationary, and the horse walks about 25 feet with the hoisting cable, raising the bucket to the track. The bucket is held there by the ratchet which is an original part of the litter carrier, and after draining for a moment is pushed along the track and dumped into the spreader.

Instead of a pump, a costly and laborious part of usual European installation, we use the same bucket for the liquid. The exterior mesh is fitted over the hole in the bucket to exclude any solids that remain, the bucket is lowered, the liquid flows in
through the 3" hole, the long-handled plug is inserted in the hole when the bucket is filled, the horse raises the bucket, it is pushed along the track, the plug is pulled, and the liquid runs into a small stock tank on an old wagon bed, and from it is spread in the field. In other words, the bucket acts simply as a slow-stroke, horse-operated pump.

If the barn is on a hillside the liquid may be run by gravity through a screened pump and pipe into the tank wagon. We have that installation, too, and it works perfectly, but its cost is probably not worth while except in a large operation, because comparatively few loads of liquid are handled. Handling by the bucket as described above is efficient, though slower than by gravity.

A few hours after the solids are skimmed off, new solids rise to the surface. Thus, continuous skimming is possible. It is rarely, if ever, necessary to get into the pit to clean it out.

We are satisfied with the system, and have had very interesting crop results where it has been applied. We hope that a properly equipped experimental station will take it up, to test scientifically the value of the fertilizing elements saved and of the hydrogen sulphide reaction. An especially interesting field for investigation seems to be the use of the liquid and solids as convenient solvents or carrying media for the minor fertilizing elements (iron, manganese, sulphur, magnesium) which, though only small quantities are needed, are considered indispensable for plant growth as nitrogen, phosphorous, and potash. For example, on half our land planted to soybeans this year we included in each load of the solid manure a sprinkling of iron filings presumed to contain manganese as well as iron. At the end of August the growth on that half was noticeably higher, more luxuriant, and deeper colored than on the other. We assume that the iron and manganese, perhaps made available by a chemical reaction from the wet manure, were responsible, as the two parts of the field were treated the same in other respects and are of similar soil and previous productivity.

From Mexico to Merino

Pedro Barba of Proctor, was born in Tepatillan, Mexico, but he has resided in the Sterling territory for 25 years. He gained his first knowledge of beet culture by working a 22-acre contract on the B. B. Erven son farm near Gill, Colorado, and then moved to Merino in 1915. He worked contracts for four years and in 1919 started farming for himself on the Sam Atkins place near Merino.

At present, with the help of his family, he is operating two farms in the North Sterling district, the Edna Tew farm and the Clair Weaver farm, and despite the shortage of water this season, he has had a good grain crop and his 41 acres of beets are exceptionally promising.

Mr. Barba knows his soil and carries on his farm operations in an individual way: His fall plowing and manuring is always completed early. The accompanying picture was taken August 15, and thirty acres had al-
Being foresighted is getting ahead! Pedro Barba, once a contract beet worker, now operates two farms. The upper picture shows him with two of his children, Henry and Maria, doing a timely job of irrigating early planted beets, and below you see Mr. Barba fall plowing August 15 for 1941 beets.

ready been disked and fifteen plowed for the 1941 crop.

He is consistent about early planting. This year one contract was planted April 7th, and thinned by May 17. These beets had obtained such an early start that no irrigation was necessary until July 1.

Mr. Barba stresses the importance of timely irrigations and at the same time conserves his water in every possible way. The 15-acre contract mentioned above saved him one run of North Sterling water by their early growth, and Mr. Barba used this water to a good advantage later in the season. However, he watches his crop and completes irrigation of it before it shows any signs of wilting.

E. S. Willis, Fieldman.

The fine Inverness farm just north of Fort Collins has been sold by Evans Farms and Feeding Company to R. M. Haythorn and son Joe of Eaton, who plan extensive improvements to the property.

The Lincoln Land Company in July completed a 24-inch irrigation well which is 58 feet in depth. This well delivers approximately .5 of a foot of water. It is located on the farm operated by Ira Anderson east of Lyman, Neb.
Among the Cow­ley, Wyoming, boys who are making names for them­selves are Fred Smith, son of Mr. and Mrs. Heman Smith, and Clive Harston, son of Mr. and Mrs. J. W. Harston. Fred, high school senior, is state president of the Future Farmers of America, and this year did all the plowing and planting of 40 acres of beets. Clive with a straight “I” average, was honor man in the School of Agriculture, University of Wyoming, the past school year, and after school was out, with his two brothers, took care of their father’s beet crop, including the thinning.

The Nowacki brothers, Brighton district, were early on the job this year using five manure spreaders and a power loader. They feed about 6,000 lambs each year and grow around 75 acres of beets when water is available.

A few years ago Joseph Kozeluh of Pompey’s Pillar, Montana, decided that he would have to work out a plan whereby he would have more manure for his crops. He did not wish to go into speculative feeding. So he worked out the following plan which has been both profitable in dollars and cents and in building up soil fertility.

He planted about 4½ acres to pasture grasses and that fall he went out and bought twenty head of calves. He wintered these calves and the next summer they ran on the irrigated pasture and were fattened out in the fall. His plan is now working successfully. As soon as he sells his fat yearlings he buys calves to replace them. This keeps about twenty head of cattle on the farm throughout the year which are growing into money and are producing fertilizer for his crops.

John Brunner, Black Hollow, Fort Collins, has undertaken an extensive program of land leveling on the farm which he recently bought. The work will be done by Gerhart Brunner, with a tractor-drawn fresno, and will take two months or more to complete. The result will be easier and more efficient irrigation of the farm with fewer fields and ditches.

J. B. Williams and Rudolph Rehder, Lyman growers, have 1,000 and 500 turkeys, respectively, and are now ranging them over grasshopper infested areas on their farms.

J. J. Ver Straten, south of Fort Collins, has completed a trench well in order to increase his irrigation supply.

Harmony district growers are pleased this year by having the Harmony road oiled and a new piler at Harmony dump, Fort Collins district.
Pumping facilities are increasing in the Bayard territory. J. L. Miller and his tenant, Carl Seib, left picture, were photographed the day their new well was tested. The middle view is a pumping plant in a pit on the farm of Judge C. G. Perry, Bridgeport, and at the right is Joe Hojio whose pit-pumping outfit has supplemented water for 90 acres of beets.

Bayard, Nebraska, farmers are increasing pumping facilities. Joe Hojio has installed a pump in an open pit on the Lindberg and Neighbors farm west of Bridgeport. This outfit has been very effective in supplementing the water supply required for 90 acres of beets. J. L. Miller, landowner, and Carl Seib, tenant, of Bridgeport have completed a well on their farm. Their pump will supply approximately 1,600 gallons of water per minute, furnishing adequate water for 40 acres of sugar beets. Accompanying picture of Mr. Seib and Mr. Miller indicates a satisfied expression on the day the well was tested, with about 25 interested spectators present. C. G. Perry, district judge, has installed an irrigation pump in an open pit on his farm west of Bridgeport, tenanted by Herman Blome. This outfit provides water for 62 acres of beets. Others operating recently-installed pumping outfits are Vogel Brothers and Earl Wathen, Bayard factory station; Alex Langhofer, Becker; Henry Leever on the J. A. Stockwell farm and Henry H. Schwindt, both of Craft; Henry Schmidt and Conrad Kniss in the Piper district; Thomas Megas of Atkins; George Chikos of DeGraw; Jake Krantz of South Bayard; Harry Schwank, Arthur Parachini, Don Merlo, and Robert Quelle of Oshkosh, and Jacob Becking and Bob Harris of DeGraw.

The four growers in the Fort Collins district who were picked to purchase farms under the government Tenant Purchase plan are the following: Glen Christiansen to purchase the Stone, Hill and Vandewark farm at Dixon; Ben Rice, the Clark farm at Barnett; Joe W. Wagner, the Thomas farm at Barnett; and Gordon Dykeman, the Joe Dykeman place at Redmond.

“Putting Down and Developing Wells for Irrigation” is the subject of a new circular prepared by Carl Rohwer, federal irrigation engineer at Colorado State College experiment station, Fort Collins, and printed by the Department of Agriculture at Washington, D. C.
# Table of Contents

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Preparation Means Fall Manuring—Dr. H. E. Brewbaker</td>
<td>167</td>
</tr>
<tr>
<td>“Remarkably High Value” for Beet Tops—Beyer Aune</td>
<td>171</td>
</tr>
<tr>
<td>Beet Tops Worth Much More to Growers Than Market Value Indicates—Jack Maynard</td>
<td>177</td>
</tr>
<tr>
<td>What Is a Ton of Manure Worth?—C. V. Maddux</td>
<td>179</td>
</tr>
<tr>
<td>Tuning in on Soil Moisture</td>
<td>184</td>
</tr>
<tr>
<td>Why Rosebud County Beet Growers Turned to Lamb Feeding—Frank Barnum</td>
<td>186</td>
</tr>
<tr>
<td>Willkie Interested in Beet Industry</td>
<td>188</td>
</tr>
<tr>
<td>Clean Ditches Pay Dividends—L. H. Mitchell</td>
<td>192</td>
</tr>
<tr>
<td>Tour of Sugar Beet Experimental Work Held in North Platte Valley</td>
<td>196</td>
</tr>
<tr>
<td>Nebraska Farmer Grinds and Siloes Tops—Lynn Pitcher</td>
<td>198</td>
</tr>
<tr>
<td>Breaking the Sod—And Building It—J. E. Facer</td>
<td>200</td>
</tr>
<tr>
<td>Progress in Sugar Beet Machinery—H. B. Walker</td>
<td>203</td>
</tr>
<tr>
<td>Some Figures on Running a Loader—John Stewart</td>
<td>205</td>
</tr>
<tr>
<td>Experience in Manure Conservation—C. H. Wilmerding</td>
<td>206</td>
</tr>
<tr>
<td>From Mexico to Merino</td>
<td>208</td>
</tr>
<tr>
<td>Around the Territory</td>
<td>210</td>
</tr>
</tbody>
</table>

The Great Western Sugar Co., Longmont, Colo.
THROUGH THE LEAVES

November, 1940

THE GREAT WESTERN SUGAR COMPANY
RESERVOIRS were low in the Spring of 1940 but final yields of beets were high. Reservoirs were full in the Spring of 1939 but final yields of beets were low. In other words, you can't tell much about final yields by early storage conditions. This is a good point to remember next Spring or any Spring: Good or bad crops may follow full reservoirs, or low reservoirs.

RAINFALL during the calendar year, and particularly during the growing season, bears a definite relationship to final crop yields. Anybody discouraged by the reservoir outlook last spring had no way of knowing that abundant rain would come in September. For forty years beets have been grown successfully in this region, and earlier records show that climate and soil would have been favorable as far back as observations have been made. Successful growers consider themselves permanently in the beet-growing business, planting a normal acreage every year. Their actual records prove the wisdom of their policy.
1940 Beet Crop Hangs Up New Records

IN August it looked like a 12-ton crop and factory superintendents figured on about 2½-million tons to slice.

By mid-November the estimate was 14.75 tons per acre for Great Western territory as a whole, and the total tonnage estimate was above 3 million tons.

That, in a nutshell, tells the late-season tonnage side of the 1940 crop, one of the most remarkable on record.

With substantially the same harvest acreage as 1939, the 1940 crop was nearly 29 per cent larger, exceeding the previous crop by about 687,000 tons.

Sugar content, however, did not keep pace with the remarkable late-season growth of the crop, and ranged from 1½ to 2 per cent below last year. Sugar content was below normal and in Nebraska was lower than in any year since 1926. With increased tonnage, however, farmers will receive on the average a greater return per acre than they did last year in spite of the low sugar content of the crop.

FOR the territory as a whole, average yield per acre was 2 to 4 tons higher than in 1939, and exceeded the 10-year average by approximately 2 tons per acre. Mid-November estimates indicated an average yield of 15.29 tons per acre in the Colorado district; 14.03 in Nebraska and 14.40 in the Billings-Lovell district.

Heavy precipitation in September and a long growing season were important factors in the high tonnages harvested. Significant also was the fact that early preparation had permitted the largest percentage of early planting on record.

How the beet crop can “take it” and “come back” after adverse conditions which would cause virtual or complete abandonment of other crops was illustrated time and again in the 1940 season. The experiences of George Smith, Alex Ramig, Joe Tilden, three Nebraska farmers, and Adolph Doerr of the Big Horn basin, Wyo., were typical of many cases where beets “licked” hail, drouth and webworms to approximate 20 tons per acre.

These cases were very interesting. George Smith, Perrin Station, Bayard, had such a discouraging outlook early in the season as a result of poor stand and water shortage that he nearly decided to plow up his beets. But he stayed with the crop and averaged 21.40 tons on 9.19 acres. After a shattering hail June 6, Alex Ramig, McGrew, was about to disc up 7 acres apparently ruined. These 7 acres averaged 20 tons per acre. Joe Tilden, Clouse dump, Minatare, averaged 21.40 tons on 6 acres which were “worthless” in June. Webworms and hail gave a double-barreled jolt to Adolph Doerr, Lovell, but Adolph and the beets fought back to the tune of 19.72 tons per acre.

Some farmers did tear up their
The industry was happy to see the astonishing late-season increase in the weight of the beets, but factory men noted that sugar content was 1½ to 2 per cent below last year.

beets, and those who replanted beets instead of other crops were glad they did. Alex Behm, Baxter dump, Minatare, lost his stand before water was available in the ditch. He replanted, irrigated up and averaged 23.20 tons on the replanted area. John P. Fink, Mr. Behm's neighbor, not only had the same experience, but actually "called his shot." When his 24-acre patch of beets died out, John made the prediction, as he replanted, that he'd harvest 20 tons or more. He actually averaged 20.15 tons per acre. That's knowing your beets!

Many individual records were established. Fort Lupton's average of 17.61 tons, highest in the Company, was also highest in the history of the district. Brighton set a new high average of 15.78 tons per acre, as did also Fort Morgan, 16.81 tons, and Brush,
Rising tonnage estimates kept statisticians busy—and editors, too. Here is A. B. Wood, editor of The Gering Courier, October 31, revising a proof headed: “Beet Crop to Show Tonnage Gain for 1940.”

16.65 tons. The 14.89-ton average at Lovell was the highest acre-yield in a decade on the biggest tonnage since the factory was built.

The swing to sugar beets was evident. In the Ovid district alone there were 84 farms which grew beets for the first time. While the yield per acre at Ovid did not break records, the tonnage did—with more than 214,000 tons, largest on record for the district.

Individual stations made gratifying records. Drake station, Fort Collins, averaged 16.38 tons per acre. Highly efficient use of a very limited irrigation supply was a factor in this achievement. Length of runs was short with penetration seldom more than 4 feet by actual test.

Wells and pumping showed their worth. The performance of the Koester brothers at Alliance, Neb., described elsewhere in this issue, was notable; while at Sidney, Neb., wells contributed to an average yield of 16.6 tons per acre against 12.59 in 1939; and Potter station showing 17.8 tons against 10.08 the previous year.

As for individual tonnage records, there were any kind you wanted. U. S. Ward of Pine Bluffs, Wyo., Ger-

In the efficiency contest, won the past two years by the Billings factory, Great Western mills are slicing the crop at around 43,000 tons a day, with the factory at Ovid (shown above) leading the race for the coveted blue pennant during the first two periods.

217
ing, Nebraska, territory, had 97 acres averaging 20.7 tons per acre, on which 15 acres averaged 32.36 tons per acre, testing 18.1 per cent sugar. If any grower had equalled this performance we had not heard of it at press time. Another outstanding large-scale performance was that of Carl Nuss, Fort Morgan, who averaged 25.56 tons per acre on 79.12 acres. The highest yield on 10 or more acres in Colorado was believed to have been realized by John and Henry Stroh, Longmont; 29.10 tons per acre on 21.94 acres, of which 13.26 acres yielded 30.86 tons per acre.

Certified yields in Eaton and Greeley districts, based on one-tenth acre tests, gave 30-ton ratings to 11 growers described elsewhere in this issue. On small plots of 1 to 2 acres, we had heard of nothing exceeding the performance of Reuben Bastron, F. F. A. enthusiast, Brush, averaging 33.92 tons per acre on 2 acres.

ILLUSTRATIVE of high 1940 Great Western yields is the following preliminary list, which lacks Brush and Billings, is not final with respect to any district, and does not include calculated yields of the 30-ton Eaton-Greeley growers mentioned elsewhere—Martin Smits, A. E. Nordell, Delbert Weber, Conrad Herbst, Guy W. Morgan, Leonard and Leo Smits, Herman Magnuson, Edward Peterson, Dobrott Brothers, Bill Barnett and Emil and Alvin Johnson:

<table>
<thead>
<tr>
<th>Name</th>
<th>Factory</th>
<th>Acres</th>
<th>Tons per A.</th>
</tr>
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<tr>
<td>Reuben Bastron (F. F. A.)</td>
<td>Brush</td>
<td>2.00</td>
<td>33.92</td>
</tr>
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<td>U. S. Ward</td>
<td>Gering</td>
<td>15.00</td>
<td>32.36</td>
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<td>John and Henry Stroh</td>
<td>Longmont</td>
<td>13.26</td>
<td>30.86</td>
</tr>
<tr>
<td>Carl Schlotthauer</td>
<td>Ft. Morgan</td>
<td>34.55</td>
<td>28.96</td>
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# THROUGH THE LEAVES

<table>
<thead>
<tr>
<th>Name</th>
<th>Factory</th>
<th>Acres</th>
<th>Tons per A.</th>
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<tr>
<td>Frank J. Spencer</td>
<td>Lovell</td>
<td>4.05</td>
<td>28.89</td>
</tr>
<tr>
<td>Carl Meininger</td>
<td>Ft. Morgan</td>
<td>31.42</td>
<td>28.50</td>
</tr>
<tr>
<td>G. K. Park</td>
<td>Ft. Morgan</td>
<td>31.32</td>
<td>28.19</td>
</tr>
<tr>
<td>Hylas Good, Jr.</td>
<td>Ft. Morgan</td>
<td>28.53</td>
<td>27.86</td>
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<tr>
<td>C. H. Nelson</td>
<td>Longmont</td>
<td>33.71</td>
<td>27.56</td>
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<tr>
<td>Harold Asmus</td>
<td>Windsor (One Test)</td>
<td>27.50</td>
<td></td>
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<tr>
<td>Fred Huwa</td>
<td>Johnstown</td>
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<tr>
<td>Glen Nelson</td>
<td>Longmont</td>
<td>23.50</td>
<td>27.23</td>
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<td>Edwin S. Anderson</td>
<td>Loveland</td>
<td>15.55</td>
<td>27.20</td>
</tr>
<tr>
<td>Dave Peterson</td>
<td>Loveland</td>
<td>16.84</td>
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<td>George Johnston</td>
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<td>15.00</td>
<td>26.85</td>
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<td>F. G. Gaylor</td>
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<td>16.40</td>
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<td>Henry Bostrom</td>
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<td>Emmanuel Uhrich</td>
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<td>26.02</td>
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<tr>
<td>Fred B. Johnston</td>
<td>Ft. Morgan</td>
<td>18.66</td>
<td>25.95</td>
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<td>Phillip Schwindt</td>
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<td>19.31</td>
<td>25.91</td>
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<tr>
<td>J. F. Loose</td>
<td>Ft. Morgan</td>
<td>28.50</td>
<td>25.89</td>
</tr>
</tbody>
</table>

Grandpa used a team of horses, but when you see Victor Englehaupt scuttling to the Crook beet dump, he’s piloting a tractor and he’s been doing it that way since 1937. Englehaupt had 61 acres in 1940 averaging around 17 tons per acre.
Processing the West’s most important crop attracts hundreds of interested visitors to the mills. C. D. Towse, Superintendent at Mitchell, Nebraska, takes a class of girls from the Sunflower School through the factory October 30.

<table>
<thead>
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<tr>
<td>Carl Nuss</td>
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<td>79.12</td>
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<td>Scottsbluff</td>
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<td>Adam Ruff</td>
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<td>C. E. Barkley</td>
<td>Ft. Morgan</td>
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<td>H. J. Yeager</td>
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<td>9.40</td>
<td>25.48</td>
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<td>George Yamada</td>
<td>Brighton</td>
<td>35.80</td>
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<td>E. Haar</td>
<td>Longmont</td>
<td>11.90</td>
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<td>James A. Roosa</td>
<td>Longmont</td>
<td>9.50</td>
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<tr>
<td>Alex Weimer</td>
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<td>R. O. Ferguson</td>
<td>Ft. Morgan</td>
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<td>Sam Hoffman</td>
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<td>D. P. Krebill</td>
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<td>Rex E. Scott</td>
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The 1940 growing season required thrifty use of water. In many sections could be seen scenes like the upper left where water was being raised 10 feet by pump from Boyd Lake to run into the Greeley-Loveland ditch. Upper right shows L. A. Parker, Fieldman, demonstrating moisture measurements on the Ed C. Miller farm, Johnstown. The lower pictures show demonstrations on the H. P. Beckel farm, left, Berthoud, and the J. H. Schmidt farm, Buda.

Improved Irrigation Is on the March

Improved irrigation is on the march! Colorado farmers are heartened by prospect of supplemental water supplies through trans-mountain diversion; meanwhile, as the 1940 crop year well demonstrated, they are doing their utmost to make the most of available water supplies. “It isn’t the amount of water you use, but the use you make of the water you have.”

This slogan summarizes the message brought home by many irrigation demonstrations throughout the territory. About 175 farmers—150 in Colorado and 25 in Nebraska—participated in irrigation experiments. The program is regarded the most important development in control of irrigation water in the history of farming in this region.

By use of the so-called Bouyoucos electrical method for measuring soil moisture under field conditions, real progress was made toward (1) learning how little moisture a plant can receive and yet survive and produce profitably; (2) learning the amount of water that should be applied in each irrigation and frequency of irrigation; and (3) learning to what extent it would be practical for farmers to use scientific devices for measuring moisture.

The 1941 crop year will see this work continued, with prospect of expanding the work from a purely experimental basis to a broader practical program.

20-Ton Club at Lovell

Twenty tons upward per acre were harvested in the Lovell, Wyo., district by Thales Smith, C. W. Mobley, Eldon Harris, Wiley Brothers, Montgomery & Sproul, Harry Allison, D. L. Pacheco, W. B. Spencer, Frank J. Spencer and T. J. Hill.
Our New Knowledge of Beet Tops

Scientific Experiments and Practical Farm Experience Prove That Tops Should Be Regarded As a Separate Valuable Farm Crop.

By E. J. (JACK) MAYNARD

The past year has thrown new light on the true feeding value of beet tops.

With relatively high feed prices in some beet growing areas this new knowledge gave beet growers added incentive to harvest their tops crop carefully to secure the fullest benefit from them.

In a recent Colorado Experiment Station feeding test lambs fattened on a ration of beet tops, white corn and "C" molasses produced the cheapest gains and greatest net profit of any group fed in the experiment. In this test beet tops not only provided all the nutrients generally supplied by alfalfa but also made a generous contribution to the fattening portion of the ration. These beet top lambs when finished for market produced the highest dressing percentage (51.4%) and selling on a par with the other lots returned a profit of $1.26 per head as compared with profits ranging from 14c to 72c per head in the other lots fed.

In a series of three feeding tests conducted with lambs during the past three feeding seasons at the U. S. Belle Fourche Experiment Station at Newell, South Dakota, beet tops added to a ration of barley, pulp, molasses and alfalfa produced as much net fattening value from tops per ton of beets as is available in 183 pounds of barley.

Based on these experiments the tops from a 14-ton yield of beets returned as much feed value as 2562 pounds of barley. The fact that groups of 100 lambs each were fed in these experiments adds materially to these findings.

A field survey was made on some 38,000 lambs pastured on tops on various farms in southern Montana and northern Wyoming last fall. These lambs were pastured for an average of 60 days and had alfalfa stubble pasture or approximately 1 pound of alfalfa hay daily in addition. Pastured at the rate of 1.4 lambs to tops per ton of beets they made an average gain per lamb (with 4% shrink) of 13.8 pounds.

These results indicate that the tops from a ton of beets plus a daily feed of one pound of alfalfa fed 84 lambs for one day and produced 19.3 pounds total gain. Figuring this gain secured at 8c per pound and with alfalfa at $6 per ton the net return for these tops fed per ton of beets was $1.29.

An impartial consideration of the above evidence points to the fact that beet tops if properly harvested.
BEET TOPS MARKETED ON THE HOOF BY 38,000 MONTANA-WYOMING LAMBS WERE WORTH $1.29 PER TON OF BEETS

1600 LBS. OF FRESH GREEN TOPS OR 400 LBS. OF CURED DRIED BEET TOPS

EACH TON OF SUGAR BEETS

EACH TON OF SUGAR BEETS PRODUCED ENOUGH TOPS TO PASTURE 84 LAMBS FOR ONE DAY

THESE LAMBS HAD, IN ADDITION, ALFALFA STUBBLE PASTURE OR 1 POUND OF ALFALFA HAY EACH

THE GROUP GAINED 19.3 LBS. PER DAY

\[
\begin{align*}
19.3 \text{ LBS. LAMB} @ \ 8\text{¢} \text{ LB.} & = 1.544 \\
84 \text{ LBS. ALFALFA} @ $60\text{¢} \text{ TON} & = 252 \\
\text{NET RETURN FROM TOPS} & = 1292 \\
\text{PER TON OF BEETS} & = 1.292
\end{align*}
\]

ARE YOU SELLING YOUR TOPS? OR FEEDING THEM FOR 35¢ PER TON OR $1.29 PER TON
and fed have a much higher feeding value than their present established market value would indicate and that a conservative valuation of at least $1.00 per ton of beets would not be out of line, recognizing, however, that this value would vary with the fluctuation in market prices of grain and hay.

For the beet grower who carefully harvests and feeds his own tops the present low established market value on tops simply reduces his cost of gains and in no way detracts from his ability to cash in on the true value of his tops. But those who are at present being misled into selling tops at a low value or who neglect giving them the care they deserve are losing a large share of one of the most valuable by-products of their sugar beet crop.

It has been amply demonstrated that the by-products from an average acre of sugar beets contain as much feeding value as the entire crop from an average acre of corn. It is because of this fact that the sugar beet has been designated “two crops in one.” A fact that is not as well appreciated is that the beet tops represent over 60% of this feeding value in the by-products from an acre of sugar beets.

Lying out in the field, exposed to inclement weather and sunlight which destroy valuable feed nutrients is the crop which has done more than any other to put this western area on the map as a livestock feeding center. Dried and cured in a like manner to alfalfa or carefully ensiled free from dirt like corn silage it will have a higher feeding value than in its present location.

In order to fully appreciate the fattening value of sugar beet by-products and especially beet tops, it is necessary to have a true conception of the real measure of net fattening value of various feeds and also to realize the true significance of a balanced ration.

The net units of fattening value in any feed are represented by a combination of its digestible carbohydrate, protein and fat content expressed as units of total digestible nutrients in 100 pounds of feed. For instance, alfalfa contains 50.3 units or pounds, corn contains 80.6 pounds, barley 78.7 pounds, cottonseed meal 75.5 pounds and corn silage 18.7 pounds. It is on this basis that feeds are evaluated for fattening purposes.

Concerning a balanced ration science has indicated that most efficient results with any feeds are only secured when sufficient protein is fed to supply the growth needs of the animal.

A most important consideration for beet growers, however, is that while carbohydrate and fat cannot be converted into protein in the body, the animal can and does convert surplus protein into carbohydrate and fat. As the standard beet by-product rations
nearly always contain surplus protein from the abundant supply of both alfalfa and beet tops fed, and as this surplus supply can be converted into cheaper fattening units than can be secured from grain, beet by-product rations are at present more efficient than fattening rations in other parts of the country. Consequently, beet growers who feed both alfalfa and tops need not be concerned with balancing a ration for protein requirements. Their concern should be to provide enough phosphorus, especially during the early part of the fattening period to properly supplement the very low phosphorus content in the alfalfa, pulp and beet tops fed.

The fattening value contained in beet tops at topping time is indicated by Morrison in “Feeds and Feeding.” The figures presented in his publication show that 100 pounds of fresh tops contain 11.4% dry matter, 1.9% digestible protein and 7.4% total digestible nutrients. Studies made by the Colorado Experiment Station show that a ton of sugar beets will produce about 400 pounds of cured dried tops containing about 70% dry matter. If there were no losses in the feed nutrients of beet tops during the harvesting period, then on the basis of the above analysis, 100 pounds of these cured dried tops would contain 11.67 pounds of digestible protein and 45.44 pounds of total digestible nutrients or the tops from each ton of beets would contain 181.76 pounds of total digestible nutrients.

This net fattening value in the tops, per ton of beets, would then be equivalent to that found in 230 pounds of barley, or the tops from a 14-ton yield of beets would be equivalent to 3220 pounds of ground barley.

But unfortunately present harvesting methods do not conserve all of the original feeding value contained in tops and too often, lack of proper care causes much heavier losses than are necessary.

IN ORDER then to arrive at the present fattening value of tops it becomes necessary to study actual results secured feeding tops that have been harvested in the customary manner, that is, gathered into small piles in the field, cured and dried and fed in standard beet by-product rations.

These figures are available from several sources. An outstanding example is afforded by the results secured at the Belle Fourche Experiment Station at Newell, South Dakota, where tops from each ton of beets fed to fattening lambs replace 13.2 pounds of barley, 48.7 pounds of pressed beet pulp, 2.5 pounds of molasses and 251.6 pounds of alfalfa in producing each 100 pounds of gain. In this series of experiments the beet tops from a ton of beets replaced 143.77 pounds of total digestible nutrients or the equivalent of 183 pounds of barley. These figures indicate then that beet tops from a 14-ton yield of beets carefully harvested and fed along with other beet by-products, alfalfa and grain have a grain replacement value equal to more than a ton of ground barley per acre.
What Farmers Say About Manure

County Agents Canvass 7,000 in 16 Counties

By T. G. STEWART
Extension Land Management Specialist

More than 7,000 farmers on irrigated land in 16 counties of Colorado were asked by county agents to give their opinions on the value of a ton of manure after it is spread on the land, together with the rate of application.

Manure is worth $2.54 per ton according to the average estimates reported by farmers in the 16 counties. Manure is worth more per ton in the San Luis Valley and on the Western Slope that it is in northern Colorado and the Platte Valley, according to reports received. Saguache County farmers place an average value of $3.41 on a ton of manure and the Weld County farmers say that it has an average value of $1.83 per ton. In Saguache County, 88% of the farmers apply less than 10 tons of manure per acre, while only 25% of the Weld County growers report less than 10-ton applications on their farms.

The difference of opinion regarding the value of a ton of manure is of interest. Two Weld County farmers venture the statement that the yields are already too high and therefore it is useless to produce and apply manure. A Montrose County farmer has this opinion: "Manure will more than double the yield and the extra yield is clear profit as it costs very little more to harvest than the smaller yield."

A Pierce, Colorado, farmer states: "Manure is a detriment on a dry year like this one. Beans all burnt up where manure was spread."

A Brighton farmer says: "Manure increased the pickle crop $100 per acre."

A Greeley farmer estimates a ton of manure to be worth $5 to $10 and adds: "Cannot farm without it." A San Luis Valley farmer says that manure is "Invaluable."

A Platteville farmer who applies over 1,500 tons of sheep and cattle manure each year gives the value per ton at $3.00 He also adds: "The value of manure is hard to tell. It takes less water and often doubles your yield and keeps your land loose so that it does not bake."

An Eaton, Colorado, farmer states: "I have staked off pieces of land and found that my yield of beets has been from 5 to 9 more tons per acre when I have applied manure than where I didn't apply manure."

A great many farmers simply made the statement that due to the condition of manure, weather con-
ditions, soil conditions, and price of crops, it is practically impossible to give a value to a ton of manure in dollars and cents. A Greeley farmer, however, is not so modest. He states: "After 40 years’ experience, we know all about the value of manure but am sure your request is silly to practical farmers."

A Montrose County farmer states: "I saw a patch of ground with this design written in manure: 'IN GOD WE TRUST,' and this design showed in the crops for 10 years. They were greener and higher."

A Greeley farmer believes that the poorer the land, the greater the value of manure. This raises the question, on many farms where trucks and tractors are used entirely and no livestock feeding is done, will we have a greater number of run-down farms in the next 25 years?

A La Salle farmer states: "I feel very well satisfied in making the statement that manure deserves the most credit in keeping up fertility on my farm. We rotate with alfalfa but without the aid of manure, our land loses its fertility very quickly. We know that by experience."

A Monte Vista farmer believes: "There is considerable difference in quality of manure—also, difference in the season when it is applied."

A Fort Lupton farmer states: "Taking care of livestock manure will earn more per hour labor than any other hour of labor on the farm."

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They vote for Manure!

Building 1941 beet yields by fall manuring in 1940:

1. Joe Weishaar, Berthoud, 150 loads, Emma B. Rekow farm.
2. George A. Kauffman and son, Elmer, on spreader, manuring 74 acres on Louis F. Bein farm, Berthoud.
3. A. and G. Reider put out 600 loads on the George Lee farm, Buda.
4. Adam Krieger spreading 500 loads for Williams & Parker, Buda, (note next year’s supply starting in the background.)
5. John Erickson spreads 300 loads on the Matthew Hamilton farm, Buda.
7. Jake Walter, Senior, left, and Junior, building a Loveland soil by 200 loads of manure.
8. This Lillian B. Pulliam farm, Buda, will benefit by 200 loads applied by Henry Schlager, right, and his hired man.

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Largest U. S. Beet Crop on Record

THE "largest crop of sugar beets ever harvested in the United States" is the 1940 estimate of 11,633,000 tons, about 30 per cent larger than the 1929-38 average, according to the Department of Agriculture. The indicated yield of 12.7 tons per acre is the highest national average on record.

Haythorns Buy Farm

R. M. and Joe Haythorn of Eaton recently purchased the "Inverness" farm north of Fort Collins. The 34.0 acres of beets on this farm averaged 21.53 tons per acre. The entire acreage was manured, irrigated and plowed in the fall of 1939. Part of the acreage was planted the last week of March and the remainder the first week in April.
A sound industry fathers pass on to their sons: Herman Gompert and Leon, 4 years old.

Parking Lot...

It looked so much like a parking lot, this farmyard of Herman Gompert, Mitchell, Nebraska, that our photographer took a picture of it when he happened by October 30. Nor does the picture on the opposite page show all the cars, trucks, tractors and automotive equipment in the yard—belonging to the farmer, his family, hired men, haulers and beet labor.

An automobile manufacturer could take a trip around the world. He could visit every tropical producing area. He could visit beet farms in a third of our states. And he could return to Detroit or wherever he lived with the satisfaction that parking problems and traffic jams are peculiar to the beet sugar industry. The beet people head the list of car buyers. They are the top customers in the sugar world.

The Gompert "parking lot" is not unique. You'd find the same scene on hundreds and hundreds of beet farms, surrounded by the same sound agricultural economy: against the horizon, busy beet workers, a crop more than 20 tons per acre; nearer, 100 cattle pasturing on hay-equaling beet tops; nearer still, a few of Mr. Gompert's 1,272 lambs, and a panorama of checker-board fields well rotated in a beet-and-feeding economy maintaining fertility. In the snug home you meet Mrs. Gompert, the fine children—a modern American home, electrical appliances, piano, radio, excellent furniture, beautiful bedrooms and bathrooms. You carry away a profound conviction of the economic and social significance of the beet sugar industry, its ramifications, its internal efficiency, its purchasing power.

"Ten thinners, eight toppers, three haulers"—and that's just a start of the employment created by Mr. Gompert's beets when you figure factory, coal, railroads, and the rest.
A Diagram of the Colorado-Big Thompson Diversion Project now underway.
Construction Progressing on Water Tunnel

Completion of the digging of the 13-mile tunnel, the key step in the Colorado-Big Thompson diversion project, may be expected within three years, engineers now hope.

The east end of the tunnel has now progressed more than 4,500 feet through the continental divide, and average progress continues at the rate of 40 feet each 24 hours.

At the west portal, more than 800 feet have been dug, and similar daily progress as that made in the east portal is anticipated soon.

Will Double Production

The tunnel is the heart of the $44,000,000 project which it is expected will double the fertility of the land of northeastern Colorado.

The importance of the project is easily understood when it is remembered that since 1925 this section of the nation's irrigated land has lost more than five millions of dollars annually through lack of sufficient moisture to irrigate its crops.

Not only would the proper amount of water on lands now irrigated double its fertility, but in consequence the area could support a greater population. Larger populations will spell prosperity to businessmen, new industries, a richer state.

The availability of great potential electric power through the creation of mighty dams will be another incentive to increase the industrial possibilities of northern Colorado. By the end of this decade, engineers hope the dream of an oasis through irrigation water will be a reality.

After the giant tunnel is dug, a concrete lining will be placed. This, it is estimated, will take about a year.

While the tunnel is being completed, other engineering features of the project will be pushed to completion. The most important, perhaps, is the Granby reservoir on the western slope and the power plant on its shores which will lift the water from the Colorado river into Shadow Mountain lake from which it will flow into Grand Lake and into the west portal of the tunnel.

Granby reservoir will collect the flow of the Colorado river and some tributaries. Power plants along the Big Thompson river on the eastern slope will be constructed, and storage reservoirs will be made in the foothills on the eastern slope—one will be near Fort Collins, in the Horsetooth canon.

Well under way is the Green Mountain dam, another large unit of the bureau of reclamation project. The dam and a power plant on the Blue river near Kremmling constitute the initial unit of the project.

When the project is completed it is expected that an average of 310,000 acre feet of new irrigation water will be carried to farmlands east of the divide.

The diversion project, for tapping water resources west of the divide, offered the last opportunity to get additional water for this region.

With the diversion project, the federal bureau of reclamation predicts, the benefits will be:

Approximately 615,000 acres of land in northeastern Colorado which previously has had an inadequate water supply will receive more irrigation water.

Storage of water will be many times multiplied. At the present time the feasible storage possibilities with the available water supply in the drainage area have been exhausted.
Weld County's 30-Ton Beet Club

By Lyman H. Andrews, Manager, Greeley and Eaton

EARLY in the 1940 harvesting season it became evident that certain beet growers in the Greeley and Eaton, Colorado, territories were harvesting beet crops yielding in excess of thirty tons per acre on portions of their beet land.

In order to verify these reports and to certify as to their accuracy Mr. L. V. Toyne, Weld county agent, and his two assistants, C. G. Staver and Harry Anderson, agreed to supervise the harvesting of representative areas in the fields, and certify the yield from the results of their tests.

The test consisted of accurately measuring a one-tenth acre strip that was pulled, topped, weighed and the proper deduction made for tare at the receiving station, under the supervision of the county agent, to determine the net yield. The 30-ton areas were found on farms where beet yields were averaging 20 to 26 or more tons per acre on substantial acreages.

Many growers' fields were tested that failed to reach thirty tons per acre by less than a ton per acre. However, there were found to be eleven growers—seven in the Greeley territory and four near Eaton—who produced over thirty tons per acre. These are listed below in the order of the highest yields and are the charter members of the "30-Ton Club" of Weld county.

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<th>Receiving Station</th>
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<tr>
<td>Emil and Alvin Johnson</td>
<td>LaSalle, Colorado</td>
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TWENTY to 26 or more tons per acre were the contract yields of these Weld county growers with portions of their fields running 30 tons or more per acre: (1) Delbert Weber's 31.98-ton section, left to right, Guy Bosworth, Dave Weber, Jr., E. E. Pritchard, Joseph and Delbert Weber; (2) Bill Barnett, 30.19 tons; (3) A. E. Nordell, left, 33.4 tons, with laborers Max Garcia and Mr. and Mrs. Coca; (4) Edward Peterson, left, 30.99 tons, Yetter and Fred Law; (5) 31.44 tons for the Herbsts, Conrad, Jr., Conrad, Sr., and Harold; (6) Emil Johnson, 30.17 tons; (7) 31.40 tons for Guy W. Morgan, right, and son, G. A. Morgan; (8) Leonard Smits, 31.37 tons, left to right—Ignacio Gonzalez, Leo and Leonard Smits, Harold Darbin and Harry Anderson; (9) Drobnitch Brothers, 30.52 tons, left to right, Ed, John, Joe, Alex; (10) Herman Magnuson, 30.99; (11) Martin Smits, 33.8 tons per acre.
A review of the factors which produced these excellent yields, outside of precipitation and climate, convinces one that it takes more than luck to get a beet yield of over thirty tons. To begin with, all of these yields came from home grown beet seed, that was planted from the last of March to April 20, averaging about April 5. The land was properly rotated and well fertilized. The average stand harvested by the entire group was 96 beets per 100 feet of row, the highest being over 120 beets per 100 feet. Except for one grower all beets were planted in rows averaging 20 inches apart, spacing; greater than 20 inches between rows decreased the yields.

Irrigation water was applied, where possible and available, in light and frequent applications. Eight of the eleven growers had an irrigation well to supplement the ditch water.

Their 1941 Crops Were Started 3 Months Ago

Here are some of the early birds starting 1941 crop preparation early in August, 1939: (1) Henry Ross, Grenfell; (2) plowing manured stubble on Jacob J. Hergenreder farm, Longmont; (3) Gus Gremel, Brighton, plowing under bean vines for next year's beets; (4) Willard Markham, Longmont.
Beets Make Big News at Alliance
High-Yield, High-Sugar, Large-Scale Koester Operation Marks New Development in Pump-Potato System

How would sugar beets do around Alliance, Nebraska?
In 1938 four brothers planted 22 acres to find out.
They planted about the same in 1939.
In 1940 they are harvesting a whopping contract of 238 acres of beets averaging around 20 tons per acre, with a sugar content to write home about.

The harvest was not completed as we went to press, but the first field of 83 acres produced 22.4 tons per acre with an average sugar content of 19 per cent. So it looks like about 90 carloads this year from the four brothers who were wondering whether to plant beets at all three years ago.

These farmers are the Koester brothers—Amos, Henry, Ernest and Paul. They have 1,360 acres just east of Alliance. You hear plenty of talk about them in Box Butte county—because beets are news and big news around Alliance and Hungerford.

Potatoes are news, too, but familiar news. The Koester brothers are shipping about 207 carloads this year. In fact, potatoes had a good deal to do with making sugar beets news in the Alliance area.

As Manager A. M. Ginn of the Bayard Sugar Factory remarked to Tom Nida, Fieldman in the Alliance area: “This proves again the old saying: If sugar beets didn’t exist they would have to be invented.”

Alliance was making, and is making, a name for itself in the production of high-grade seed potatoes. But drouth, which played havoc with other areas, also took its toll there.

The sugar beet fitted neatly into a double problem caused by drouth and threat of potato disease through successive cropping. Wells, the Alliance people knew, could relieve the water shortage. But wells cost money, and if you were going in for wells, it was a good idea to look for another top-rate cash crop. The sugar beet was the answer for the forward-looking Koesters—a top-rate cash crop and just what the doctor ordered for the potato rotation. And the neighbors are all talking beets these days.

Wells must go fairly deep in this table-land. The first Koester well, 1936, 310 feet deep, produces 2,000 gallons per minute. A second 10-inch pump produces 2,200 gallons from a well drilled to a depth of 248 feet. These wells convinced the Koesters that the water was there for the pumping, and that crop yields could be maintained—so early in 1940, with a big beet crop in mind, they put down a third well with a 12-inch pump, delivering 3,000 gallons—the three wells giving a combined output of 7,200 gallons or 16 second feet.

KOESTER Brothers planted in 1940, in addition to their beet crop, a total of 415 acres of grain seeded with alfalfa and secured a good stand on the entire acreage. They have about 350 acres in potatoes and a similar acreage being summer fallowed prior to planting in 1941. The
The folks all around Alliance are talking about the 20-ton, high-sugar per cent beet crop grown this year on a 238-acre contract by the Koester brothers, left to right: Amos, Ernest, Henry and Paul.

system of rotation as now planned consists of grain and alfalfa, two years alfalfa, one year potatoes followed by one year beets. This will give them approximately 350 acres of potatoes each year and the same acreage for beets, with potatoes on the same land only once in five years, which they feel will provide ample insurance against plant disease affecting their high-grade seed potato crop.

At the same time this rotation will furnish through the beet crop, not only an important source of cash revenue, but also will provide a most important supplemental revenue from beet tops which, together with their alfalfa, will serve in connection with the feeding of livestock to keep up the fertility required for an intensive farming program of this kind.

A beet receiving station has been built near the Koester farm. The city of Alliance also grew beets this year on land irrigated by condenser waste water from the city electric plant. The city farm is under supervision of George Schmid, formerly with the Box Butte County State Experiment farm.

Osland Away, Tom in Charge

H. B. Osland, head of the Animal Investigation Section, Colorado State College, began a year's leave in September to study at Iowa State College for a doctor's degree. R. C. Tom, associate in animal investigations, has returned from Iowa State College, where he studied toward a doctor's degree while on leave last year. He is acting head of the Section in Mr. Osland's absence.
The Koester brothers cultivate 1,360 acres of which 1,200 are irrigated, three pumping plants producing 7,200 gallons per minute:
(1) 1936, 2,000 gallons; (2) 2,200 gallons; (3) the 1940 3,000-gallon well that was put in to help the big beet crop; (4) distributing water by a cross-lateral; and (5) up-to-date beet loading equipment for the 1940 crop which ranged from 19 tons to 22½ tons per acre on the first 83 acres—with 155 just as good yet to be heard from.

From Cactus to 21½ Tons in Three Years

The Notable Achievement of a Sidney, Nebraska, Family

THREE years ago, if you'd been driving west on the Lincoln highway you could have looked out your left-hand window five minutes from Sidney, Nebr., at a certain tract of sage brush and cactus supervised by jack-rabbits, prairie owls and gophers.

Through the same window, on the same site, in November, 1940, you could have seen Henry Haupt and his family finishing harvest on 20 acres of sugar beets averaging better than 21½ tons per acre. And wheat, oats, barley and corn! A real farm reclaimed from a sunburnt waste, with Russian olive trees starting up, and flowers, too.

Henry Haupt and his family work hard together and have fun together. Marie and Lydia, his oldest daughters, are his "chief bouncers," he says. They "bounce all over the place," he says, and "bounce bad yields out the door" and "good yields in." There are smaller children also: Marta, Dina, Emma, Albert, Edward and Jerry.

When the pump was running this past summer 48 to 50 days, day and night, young Albert was "a bouncer," too. Albert "did half the irrigating,"
Mrs. Haupt said, while his father was catching forty winks of sleep.

Back of that pump is the story of this farm. Henry Haupt, a beet worker in 1931, started farming for John Baxter Minatare, Nebr., 1932, and came to Sidney in 1939 to try his fortune on this piece of dry land on which the Equitable Life Insurance Company had put down a well in 1938.

Henry and his wife, Katherine, had a big family, a little money, 3 cows, experience, ability to laugh at hard luck—and this well throwing 800 gallons a minute to stake their luck on. The farm was "just as dry as those hills over there."

The first year, 1939, the family realized 114 tons of beets per acre on 28 acres, potatoes at about 100 bushels per acre, but the corn ran only 7 bushels, and 30 acres of oats and barley yielded only 62 bushels all told. In 1940 the farm was better organized. Henry had also hauled in about 400 tons of manure from his neighbors. And his 1940 yields ran: beets, 21.52 tons per acre; potatoes, 250 bushels per acre; corn about 65, wheat 42, and oats and barley about 50 bushels per acre. The farm has 107 acres irrigated. And with Henry and his "bouncers" on the job, it's a farm to watch.

Wild morning glories have become one of the most serious of weed pests in some parts of the corn belt; so much so, that banks and insurance companies decline loans on farms found to be infested with the smothering, strangling vines. They multiply at an amazing rate from the abundant seed which they produce, and once in the soil they are practically impossible to get out because they grow perennially from fleshy roots so deeply buried that only a trenching machine could reach them.

—Iceber Service.
Many new dumps like this at Heldt, Nebraska, handling 20 carloads a day, make work easier for the farmer.

But there's still plenty of work, Charles Nycum of the dump crew will tell you. Charles, left, star blocker of the Scottsbluff '37 championship team, "blocks" a 1940 carload of beets. Fieldman J. S. Rice is seen, right.

Million-Dollar Program Aids Farmer

A striking contrast is seen between present equipment for receiving the beet crop as compared to facilities used as recently as 12 years ago. In 1928 over a million tons or 31.4% of the crop was hand piled. In 1940 only 50,000 tons or 1.6% of the crop was hand piled. To accomplish this result the company has purchased in the past 12 years 97 portable beet piling machines, which, with necessary land, modern scales, etc., represent an investment of approximately one million dollars. The Heldt station near Scottsbluff, Nebr., is one of the new modern, stationary units for receiving direct delivery beets with a capacity of 20 cars per day. Twenty-three units of this type purchased within the past four years represent an investment of over $100,000. In addition to these 23 units, farmers are now served by 108 power dumps of various types that have been installed in the past 20 years. Ninety of the old highlines still remain. No highlines have been built since 1924. Modern trucks with increased capacities have necessitated the purchase of 97 new 15-ton truck scales within the past three years, at a cost of $50,000.—C. H. Jonson.

Only 1.6 per cent of the crop was hand-piled in 1940, this picture showing the Highline at Beta, Sterling district.
A Basement and an Old Wreck of a Barn...

A BASEMENT "with a roof over it and an old wreck of a barn"—
That was the prospect James L. Lippincott and his wife faced when they arrived 13 years ago on an unpromising piece of land four miles south and a mile east of Lyman, Nebraska.

They understood it was possible to grow sugar beets. The new factory was starting up in 1927. They grew beets. The first crop ran 9½ tons per acre.

Change the scene rapidly to November, 1940, and here's a quick summary of what you find in place of the "basement with a roof over it and an old wreck of a barn."

You find one of the finest modern houses in Western Nebraska: big airy rooms, comfortable furniture, a spacious kitchen with every electrical appliance a woman could want; in fact, the only way you know it's a farm house is because it happens to be in the country. And there's a beautiful piano, radio—everything.

Jim Lippincott today operates 4 farms, about 800 acres. For the past 7 years his sugar beets have averaged around 20 tons per acre. In 1940 he had a large contract of 74 acres and averaged 19.44 tons per acre on the whole works—just about 10 tons per acre better than the first crop he grew.

The old saying: "Where you find high yields you find livestock" is certainly true of the Lippincott farms. He was expecting to feed at least 270 cattle and 8,000 ewes and lambs this winter. In 1938 he fed out 700 cattle and 23,000 sheep.

Modern farm machinery is much in evidence on the Lippincott farms, and in excellent condition, but Jim has a warm spot in his heart for horses. Of his 30 big Percherons some are registered and all are eligible for registry. They make a fine sight—a four-horse team pulling the beet wagons up the field, helping Jim to put as many as 260 tons of beets over the dumps a single day.

The Lippincott cropping system, with manure, produces high yields of all crops—500 bushels of potatoes for example, and barley running better than 80 bushels per acre.

Mrs. Lippincott, active in 4-H leadership and community service, manages the household side of the farm as skillfully as her husband in field and feed lot. This year she raised 1,500 turkeys.

The two daughters, Dorothy Jean, 12, and Mary Lou, 11, are hustlers, too, witness the fact that they recently carried off $27 in 4-H prizes.

Every phase of the Lippincott farm and home life is typified by resourcefulness, management, ability—and always doing today's job with an eye on tomorrow.
Leaf Spot Is on the Way Out

Large Crowd at Fort Morgan Field Day Sees Progress in Plant Breeders' Battle Against Disease

HOG cholera may be prevented by vaccination or perhaps eliminated through breeding of resistance. Black stem rust in wheat is rapidly becoming a matter of history as a result of the production of Thatcher and other resistant varieties. Curlytop resistance has saved the sugar beet crop west of the Rockies. So also leaf spot appears to be on its way out as a result of the efforts of plant breeders in the United States Department of Agriculture, the Great Western Sugar Company, and other sugar companies.

This was the claim made by Dr. H. E. Brewbaker, plant breeder for the Great Western Sugar Company, at a field day meeting of about 100 members of the Great Western Sugar Company Agricultural Staff held at Fort Morgan, September 24, 1940. At this meeting, Dr. G. H. Coons and S. B. Nuckols of the Sugar Plant Division, United States Department of Agriculture, were visitors. Mr. H. W. Dahlberg, Chief of Research, Great Western Sugar Company, briefly explained the purpose of the investigations.

The principal object of the visit was to see the breeding and variety testing work being conducted by the Great Western Sugar Company on the Clyde Barkley farm at Fort Morgan. Here it was possible to see but a few of the 5900 small plots devoted mainly to breeding for leaf spot resistance. This work was begun several years ago and great progress had been made. Of 1000 breeding families being tested both on the Barkley farm and the Great Western Sugar Com-

The large crowd at Fort Morgan saw beets shot to pieces with leaf spot growing side by side with fine healthy beets from which the disease had practically been eliminated.
Science goes into a barnyard huddle. Sitting on the watering trough, Henry W. Dahlberg, Research Manager of the Company, tells visitors at the Barkley farm that out of 1000 breeding families of sugar beets now being grown by the Company, fully two-thirds are extremely resistant to leaf-spot.

Company Experiment Station at Longmont, fully two-thirds are extremely resistant to leaf spot and will be expected to carry this resistance into the commercial variety.

"These families which are so resistant to leaf spot are the building blocks out of which we expect to produce resistant commercial varieties, and some pedigreed increases which continue to show extreme resistance are already being tested for yield and other characters," said Dr. Brewbaker. "This is only the beginning, for these pedigreed lots should be tested for at least two or three years before they are increased and released as commercial varieties, so don't become too impatient to have commercial seed of this very resistant material," he said.

Later, on the Harry Bollinger farm, the group observed two 12-row strips of GW9, a variety possessing considerable resistance to leaf spot. While the remainder of the field, which was planted to ordinary commercial seed,
had burned down rather heavily with leaf spot, GW9 was standing up with materially less damage from the disease. GW9 is the first quite resistant Great Western variety. Later selections from GW9 show marked improvement in resistance to leaf spot.

Leaf spot is caused by an organism which carries over from one year to the next on old infected beet leaves. It is usually observed earlier in the season where beets follow beets, especially where leaf spot occurred the previous season. Like black stem rust of wheat, however, the spread of the leaf spot disease is favored by damp weather, and under favorable conditions becomes an epidemic which spreads rapidly over large regional areas. In this event, fields of beets become heavily infected regardless of the previous crop.

Resistance to leaf spot is hereditary, and while absolute immunity or complete freedom from spots may not be obtainable, the most resistant material will remain nearly spotless when the ordinary commercial varieties burn down with leaf spot. The loss may amount to as much as 25 to 40% in total sugar per acre where the disease is serious.

There is nothing miraculous in resistance to leaf spot, and there is every reason to expect highly productive resistant varieties will replace the present commercial susceptible ones within the next few years. Then will the sugar beet, which is now recognized as a very efficient producer of food, become an even more efficient producer of both sugar for human consumption and tops and other by-products for the livestock feeder.

Billings Junior Fat Stock Show

By E. J. MAYNARD

This third annual event was staged October 11 to 15 at the Midland Empire Fair Grounds at Billings, where more than 300 youthful 4-H club and F.F.A. exhibitors from Montana and northern Wyoming showed and then sold some 770 head of fat calves, lambs and hogs for a total of $29,569.

Results of the grading by experienced market representatives showed a marked improvement over last year.
in the quality and finish of the fat stock shown as indicated in the following table:

<table>
<thead>
<tr>
<th>Year</th>
<th>Prime</th>
<th>Choice</th>
<th>Good</th>
<th>Medium</th>
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<tbody>
<tr>
<td>1940</td>
<td>15.0%</td>
<td>40.9%</td>
<td>31.3%</td>
<td>12.8%</td>
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<tr>
<td>1939</td>
<td>8.4%</td>
<td>19.2%</td>
<td>49.6%</td>
<td>22.8%</td>
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In the cattle division 57 calves were in the Medium grade, 76 graded Good, 47 were graded Choice and 16 reached the coveted grade of Prime. Youngsters with Prime calves included William Brown, Mary Sanford and Earl Hodges of Bridger, Montana; Bill and Eugene Coombs of Laurel, Montana; Wilbur Reed and Eugene Earhart of Powell, Wyoming; Everett Sanderson and Eugene J. Yost of Billings; Sue Ellen Buchanan and Richard Smith of Cody, Wyoming; James Black of Wordland, Wyoming; Vic Eisenman of Park City, Montana; Elaine Guth of Wilsall, Montana, and Helen Yates of Fishtail, Montana.

The Prime calves sold at an average weight of 1,047 lbs. They brought an average of $14.37 per cwt., or $144.30 per head. The cost on the average of $46 per head and their feed cost averaged $49.70 which indicates an average net return of $48.60 per head.

This is the premium that butchers, grocers, packers, bankers and individuals were willing to pay to encourage the development of livestock feeding among the youngsters.

More than half of the owners and exhibitors of Prime calves were sons of beet growers.

It is to be hoped that future shows may provide some worth-while goal for efficient production as well as for perfection in form and finish.

All youngsters received good prices for their stock due to the widespread interest and buying power at the sale staged by the Billings Livestock Commission Company.

ROSES COYOTE ON WAY TO WORK

Lee Cleveland leaves "Pat" in the corral while he rides herd on the beet pile.

WHEN a top cow-hand can rope a coyote on his way to work as Lee Cleveland did October 21, it's a sign the Old West hasn't got too new-fangled. Lee is a tare man at McGrew, Minatare district, Nebraska. He has a dry land ranch and cattle. He rides "Pat" to work and "every cow-trail is a mat of tracks." That Lee and "Pat" are a pretty fast-working team is proved by the fact that the luckless coyote was roped within 500 yards of where he was discovered. Lee has ridden in many rodeos and out-foxed plenty of bucking horses in his time.
The Hail Helped With the Thinning

They had the last laugh on the disc which was about to tear up the beet crop—and a 20-ton laugh at that—Alex Ramig and his wife, Elizabeth.

YES, sir, he would disc up his beets and plant beans! That was the resolution of Alex Ramig of McGrew, Nebraska, after the hail of June 6. You never saw a sicker looking field. He had just started thinning a 7-acre patch on his 30-acre contract. But knowing the reputation of beets for coming back after hail, Alex, being a good farmer, decided to count 10 before hooking up the disc. And late in October he had the satisfaction of taking 140 tons net off the 7 "worthless" acres, exactly 20 tons per acre. On his whole 30 acres Alex averaged 17.07 tons per acre, according to A. E. Heldt, Fieldman. The field was in grain last year, manured and planted by April 15.

C. E. Shern at Twin Bridge, Loveland, had 24.56 acres which produced 19.63 tons per acre. In this same contract they measured .52 acres that produced 29.24 tons per acre. This entire crop was blocked with a Dixie Cotton Chopper to an 8-inch stand, the closest stand that Mr. Shern ever had and produced the highest tonnage that has ever been produced on this place as the previous high tonnage for this place over a 16-year period was 16 tons per acre.
Typical of many of their blood doing industrial work and general farm work: Victor Hidalgo, left, "punching noodles" at the Bayard factory, and Victor Carrillo driving spreader helping P. D. Grommon, on tractor, build farm yields at Welty by fall manuring and fall plowing.

Not by Beet Work Alone—

ABILITIES and opportunities of Spanish-speaking workers are not limited to beet labor alone. Characteristic of hundreds in varieties of activity throughout the beet territory are two men pictured here, Victor Hidalgo, a factory worker, and Victor Carrillo, doing general farm work. Both, born in Mexico, are on the road to citizenship.

Hidalgo, who came to the United States in 1920, worked beets, graduated from Bayard, Nebr., high school and attended Hastings College 2½ years. He has worked several campaigns at the Bayard factory, where he worked on the diffusion battery in the 1940 campaign.

Victor Carrillo, driving the manure spreader for P. D. Grommon, Welty, Loveland district, on the farm of Mrs. L. C. De France, is typical of the large number of his nationality who do general farm work as well as beet work. He has taken out his first papers. From P. D. Grommon, (shown on the tractor) Carrillo has opportunity to learn the most approved farming methods. When photographed he was helping Mr. Grommon apply 350 spreader loads of manure ahead of fall plowing for the 1941 beet crop.

Company Makes November Payment

FIRST payments by The Great Western Sugar Company for the 1940 sugar beet crop, with calculated government payments arising in connection with the processing tax collected from the manufacturer, total $17,446,500, against $14,512,300 in 1939, on substantially an identical harvested acreage.

Total of Company November-Dec-
November payments beginning November 15 is $12,011,800. These initial Company payments plus the government payment amount to an average "starting price" of approximately $5.62 per ton in the Colorado-Nebraska-Wheatland, Wyo., area and $6.18 per ton in the Billings, Mont., and Lovell, Wyo., districts.

The Company's initial payment per ton on the same sugar content is higher than last year, but the substantially lower quality of the crop as a whole results in an average first Company payment per ton lower than in 1939, approximating $3.87 per ton as an average in the Colorado-Nebraska-Wheatland area and $4.25 in the Billings-Lovell district. With the increased tonnage, farmers will receive on the average a greater return per acre than they did last year, in spite of the low sugar content of the crop.

By districts initial payments total as follows: Colorado, $6,950,611; Nebraska-Wheatland, $2,427,618; Billings-Lovell, $2,111,009.

Good Well Is Crop Insurance

A GOOD well is crop insurance! Among the growers in the Bayard, Nebr., district who have recently installed irrigation plants are Tom Megas, David Langhofer, Sr., Victor Nuss, Fred Schmick, Manuel Schreiner, Conrad Sterkel, Alex Sauer, Conrad Green and George Schlegel. Henry Erdman, Becker territory, recently installed a new 45 h. p. Allis-Chalmer power unit to operate his pumping plant. Henry Schwindt, Craft, put in a 5-inch Fairbanks-Morse pump to furnish water for the farm he purchased last year. Water goes through two sections of 8-inch wood pipe, 700 feet in one direction and 835 feet in another. The pump delivers about 800 gallons a minute.

20-Tonners at Minatare

Newcomers in the 20-ton class at Minatare, Nebraska, include the following: Alex Behm, John P. Fink, Albert Kaufman, Peter Rau, Dave R. Reichert, Jr., Fred Schlager, Joe Tilden, Peter Aschenbrenner, Fred Webster, Henry Dittenber, Joe Schumacher, Willis Nichols, Cecil Peck, George Deines, Jr., and George Brackman.
THE old settling basin along the river east of Loveland was about the last thing a farmer would expect to produce good yields, but Roy B. Dodrill, who came in from Hays, Kansas, three years ago, became interested in the problem. Used for about 12 years, the settling basin is mostly waste lime with some soil mixed in.

Renting 300 acres comprising Company pasture, he worked out drainage systems and experimented with growing crops.

In the spring of 1940 he planted 18.5 acres of beets which finally averaged 14.02 tons per acre. The abundant top growth was noticeable. The field was harvested without use of a puller. Mr. Dodrill made special arrangements with his labor to pull the beets by hand. The tops were hauled in immediately behind the toppers and amounted to 400 tons, or an average of 21.6 tons of tops per acre.

The tops were put into a pit silo, 85 feet long, 12 feet wide and 12 feet deep at the deep end and were stacked about 10 feet above the ground level.

Mr. Dodrill also grew corn on the settling basin “wasteland” this year, getting enough silage from 30 acres to fill a pit silo 140 feet long, 14 feet wide and 14 feet deep—approximately 400 tons.

Byron Ballentine, at Brule, Nebr., is feeding 500 head of lambs this winter. Byron harvested a 13-ton crop on an unmanured field, over 19 tons per acre on alfalfa ground and better than 21 tons on a well manured field. As a matter of interest, the 21-ton beets were replanted April 14, after the original planting was lost on account of the severe freeze on April 11.

Charles Robertson and Jacob Stieben had the outstanding yields at Barnett station, Fort Collins. These growers had their entire acreage planted by April 6. These yields exemplify the advantage of timely planting and timely care of the crop.
## Table of Contents

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>It's Beets Over the Dump That Tell the Story</td>
<td>214</td>
</tr>
<tr>
<td>1940 Beet Crop Hangs Up New Record</td>
<td>215</td>
</tr>
<tr>
<td>Improved Irrigation Is on the March</td>
<td>222</td>
</tr>
<tr>
<td>Our New Knowledge of Beet Tops—E. J. Maynard</td>
<td>223</td>
</tr>
<tr>
<td>What Farmers Say About Manure—T. G. Stewart</td>
<td>227</td>
</tr>
<tr>
<td>Parking Lot</td>
<td>231</td>
</tr>
<tr>
<td>Construction Progressing on Water Tunnel</td>
<td>233</td>
</tr>
<tr>
<td>Weld County's 30-Ton Beet Club—Lyman H. Andrews</td>
<td>235</td>
</tr>
<tr>
<td>Their 1941 Crops Were Started 3 Months Ago</td>
<td>236</td>
</tr>
<tr>
<td>Beets Make Big News at Alliance</td>
<td>237</td>
</tr>
<tr>
<td>From Cactus to 21½ Tons in Three Years</td>
<td>239</td>
</tr>
<tr>
<td>Million-Dollar Program Aids Farmer</td>
<td>241</td>
</tr>
<tr>
<td>A Basement and an Old Wreck of a Barn</td>
<td>242</td>
</tr>
<tr>
<td>Leaf Spot Is on the Way Out</td>
<td>244</td>
</tr>
<tr>
<td>Billings Junior Fat Stock Show—E. J. Maynard</td>
<td>246</td>
</tr>
<tr>
<td>The Hail Helped With the Thinning</td>
<td>248</td>
</tr>
<tr>
<td>Not by Beet Work Alone</td>
<td>249</td>
</tr>
<tr>
<td>Company Makes November Payment</td>
<td>249</td>
</tr>
<tr>
<td>Good Well Is Crop Insurance</td>
<td>250</td>
</tr>
<tr>
<td>Making a Wasteland Grow Good Crops</td>
<td>251</td>
</tr>
</tbody>
</table>

The Great Western Sugar Co., Longmont, Colo.