Century of Progress

In this centennial year of its own success, the United States beet sugar industry is honored to salute Colorado State University as it starts its second century of important contributions to U.S. agriculture and knowledge.

The two institutions, interdependent in part on each other, have flourished together despite numerous setbacks. The university and the industry have prospered and grown from cross-fertilization of ideas.

On the next page of this magazine begins the first of two articles on the vital part played by CSU in getting the sugarbeet industry started in Colorado and on its valuable contributions to the entire industry throughout the past century.

A land grant institution, closely associated with the United States Department of Agriculture, the Fort Collins school and its experiment station not only educated many GW beet growers and trained many members of the GW agricultural staff, but it sent many prominent educators and scientists to even greater accomplishments in the sugar world.

Men like Dewey Stewart, Jack Maynard, and George Coons—to name but a few who left CSU to go on to greater successes in USDA or the beet industry—are mentioned in the “Through the Leaves” series. Their contributions to sugarbeets will never be forgotten. Neither will the work of those who remained at CSU be forgotten. Nor will accomplishments of scientists like John Gaskill, Mrs. Merle Payne, William Kreutzer, Leonard Jenkins, Alex Dotzenko, Robert Whitney, Jack Altman, and L. W. Durrell, and others, who are still connected with CSU. Their important work also is described in the articles.

Without Colorado State University and its dedicated leaders throughout the last 100 years, the sugarbeet industry in America could not possibly have attained its present status. As CSU’s Dr. Durrell stated it so well: “Think of all the mechanics, chemistry, entomology, plant pathology, agronomy and other sciences that go into the production of beet sugar. It’s amazing.”

And it is amazing to us how one school has contributed so much to the success of a single industry.

To Dr. A. R. Chamberlain, the present president of the great Colorado State University and to all the administrative and teaching staff at the school and experiment station, we offer deep-felt gratitude and heartiest congratulations for the notable accomplishments of the first 100 years and best wishes for continued success in the centuries ahead.

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# Highlights

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Growers Get Equipment Ready As 1970 Beet Harvest Nears

By JOHN D. EDMISTON
GW Agricultural Staff Manager

The 1970 sugarbeet harvest is almost upon us, and growers and GW personnel are looking forward to a good one. Generally speaking, the crop in late summer looked promising in most parts of the GW territory.

A majority of the growers had their harvesting equipment ready to roll, allowing for last minute adjustments and minor repairs. Most growers realize the importance of carefully checking their equipment to make sure when harvest begins there will be no preventable delays.

One of the main concerns is removal of trash and clods from the beets. Delivery of clean beets, free of foreign matter, expedites unloading at the receiving station and increases the storage life of beets in the piles.

It has been found in some cases that growers often carry in a single load a couple of tons of dirt to and from the receiving station. At today’s high cost of trucking, no one can afford to do this.

As a general rule, excessive field speed in topping and harvesting results in poor loads of beets arriving at the receiving station. Excessive speed doesn’t permit proper operation of variable cut topping devices and, in addition, the beets can’t be properly screened.

Cold nights and early morning frosts are another problem. Freezing weather can cause harvesting and storage headaches. Normally growers deliver beets immediately after they are dug. However, those who dig beets in the late afternoon, or too late for prompt delivery to the receiving station, should protect these loads if they are stored overnight. The trucks can be placed in a barn or shed or the beets covered with canvas. Even a layer of beet tops will help if thrown over the load.

Growers delivering over long distances in freezing weather should protect loads with a tarp cover so that beets won’t be frost-damaged. Frosted beets result in less sugar recovery and deteriorate in pile storage.

Another good point to remember is the loss of beets in delivery. Few growers, or anyone else for that matter, would like to see a cup of sugar thrown out the window. And yet that is what happens every time three or four average size beets fall off a truck on the highway.

Growers also should be cautious about overwidth loads which can scatter beets on the road and thus create a traffic hazard. Not only is this dangerous for other vehicles, it wastes good beets and can be costly if the authorities catch the offender.

Times have changed since the 1-row harvester was a beet machinery pioneer and hand topping and hand loading was the rule.

Today’s harvest system has 2-, 3- and 4-row toppers going through the beet fields, followed by multiple-row harvesters. Two- and 3-row harvesters have become common.

Separate Topping Operation

The 1970 harvest will see many farmers removing tops in a separate operation, as compared to having topping equipment on the harvester. This has made possible faster ground speeds while doing an efficient and clean harvesting job.

Topping and harvesting in multiple row operations means less ground travel for the grower, while still producing the same tonnage for each day of the harvest.

Another point of interest in the 1970 harvest will be the increasing number of growers who ensile their beet tops for livestock feeding. It is generally recognized that windrowed tops pastured in the field do not produce as much net value as properly ensiled tops.

Lionel Harris, head of the University of Nebraska’s Scotts Bluff Station, has amply demonstrated the value of beet tops in feeding tests, as shown in his article on pages 12-13.

Let’s all work together to do all we can to get beets harvested in a proper and timely manner this year.
Sugar in Beets Harvested | GW Payments per Ton of Regular Beets at $8.75 Net Return* | GW Payments per Ton of 1968-crop Beets at $8.455 Net* | Column 2 More Than Column 5
--- | --- | --- | ---
(1) | (2) | (3) | (4) | (5) | (6)
19½ | $18.739 | $18.413 | $.325 | $17.771 | $.968
19 | 18.134 | 17.868 | .267 | 17.245 | .889
18½ | 17.530 | 17.323 | .207 | 16.719 | .811
17 | 15.716 | 15.687 | .029 | 15.140 | .576
16½ | 15.112 | 15.141 | (0.029) | 14.614 | .498
16 | 14.507 | 14.596 | (0.089) | 14.087 | .420
15½ | 13.903 | 14.051 | (0.148) | 13.562 | .341
15 | 13.299 | 13.506 | (0.207) | 13.035 | .264
14½ | 12.694 | 12.961 | (0.266) | 12.509 | .185
14 | 12.090 | 12.415 | (0.326) | 11.982 | .108
Simple Average | 15.414 | 15.414 | | 14.677 | .537

*Scale prices without application of minimum sugar content provisions.
Sugar Act payments not included.

1970 Beet Price Scale Changes
More Equitable for All Growers

More equitable for all growers.

Greater GW payments for each percent of sugar in high content beets and lesser payments for each percent of sugar in low content beets, with no changes at the 16.75% level, are embodied in the 1970 contracts.

The change in the scale from 1969 contracts was adopted not only as an incentive for higher sugar contents but was necessary to correct an inequity among growers. Over the entire range of prices, the average payments the Company will make to growers, at comparable levels of net return per cwt. of sugar, remain the same.

But, as Robert J. Fisher, GW vice president in charge of grower relations, pointed out at the 1970 contract negotiations, the high content beet growers had been getting less payment per pound of recoverable sugar from their crop than the growers with beets of low sugar content. Now an identical price per recoverable pound will be paid.

At identical levels of net return, 1970 GW payments will be greater than the 1969 regular scale above 16.75% sugar content and lesser below that standard. Company-wide average sugar content was approximately 16.75% for the 1960-68 period.

One other change was agreed upon for purposes of making payments under the 1970 contract. Final average sugar content, under a grower's 1970 contract, will be carried to one more decimal place than heretofore. For example, a final average of 17.14% will not be rounded to 17.10% as in the past, and 17.16% will not be rounded upward to 17.2%.

For the 1968-crop marketing year ended Sept. 30, 1969, the settlement net return was $8.455 cwt. of sugar. On the basis of raw sugar prices from last October through August of this year, the 1969-crop settlement net will approximate $8.75. No one can forecast with any degree of accuracy what the 1970-crop settlement net return will be.

For illustrative purposes only, however, the $8.75 net can be used. The actual 1970 settlement net return, covering the year to end Sept. 30, 1971, can be higher or lower than that figure.

The above table shows how scale prices differ between the 1969 regular beet contracts and 1970 contracts, at an $8.75 net return, and also the difference between 1968 prices at the actual 1968 settlement net of $8.455 and 1970 prices, under regular contracts, if the 1970 settlement net return is $8.75 per cwt. of sugar.

CARIBBEAN SUGAR OUTPUT DOWN

Sugar production in a group of Caribbean areas in 1970 was the lowest in 11 years, according to the secretary of the West Indies Sugar Association. Output in St. Kitts and Trinidad fell below 1969 to more than offset slight increases in Barbados, Jamaica, Antiqua, and Guyana.
No USDA Restriction On 1971 Sugarbeets

No beet acreage allotments for 1971! USDA announced Sept. 3 it had accepted unanimous views of industry spokesmen at the Boise, Ida., hearing July 29 that next year should be free of restrictive proportionate shares.

Richard W. Blake, Malcolm Young and Phillip E. Jones had testified that industry statistics obviated the need for acreage restrictions next year.

Blake, executive vice president of the National Beet Growers Federation, said that "price is the most important factor in determining beet acreage" and urged USDA to administer Sugar Act consumption requirements and quotas as to encourage beet plantings.

Young, executive manager of the California Beet Growers Association, urged USDA to announce in September that there would be no 1971 acreage contracts so that growers in that state, who plant much earlier than elsewhere, could make their plans promptly.

Blake and Young appeared for all organized beet growers in the United States.

The spokesman for all the companies, Jones, of the U.S. Beet Sugar Association, said that legally and statistically 1970 allotments could not be justified.

The Sugar Act requires that beet acreage be restricted when, in the absence of controls, growers would likely produce sugar above the industry’s quota and inventory requirements.

Congress, in a “legislative history” declaration, held in passing the current Sugar Act, that the beet area’s effective inventory should range between 82 and 90% of marketing quotas.

William Alewine, witness for USDA, introduced data into the hearing record showing that beet sugar on hand last January 1 amounted to only about 78.5% of the industry’s marketing quota of 3,597,000 tons, in effect on July 29. He also said that 1970 crop production would probably range between 3,250,000 and 3,325,000 tons of sugar, resulting in an effective inventory next January 1 of only 69-71% of next year’s quota if set at the current level.

After a record planting of 1,657,000 acres in 1969, allotments for 1970 were initially set at 1,450,000 acres, later raised to 1,550,000 acres, and finally rescinded. Plantings this year are now estimated at 1,445,000 acres.

Beet Testing Movie Gets Final Touches

Finishing touches are being applied to the growers associations-GW sponsored movie, “Weighing, Taring, and Testing Sugarbeets.” Originally intended for showing last winter, completion of the film was delayed because of problems connected with the 1969 harvest and campaign.

The movie, which covers procedures from the time beets are delivered until analyzed for sugar content, will be ready for presentation beginning this month to growers, tarehouse crews, and others.

As Dick Blake, executive vice president of the National Sugarbeet Growers Federation, states in the movie’s introduction, “the film presentation attempts to answer many of the questions growers have asked of their associations. Among these questions are: Why are tares taken? How are sugar tests made? What do the associations do about checking the procedures? How do we know we are getting fair and accurate results?”

Under supervision of the movie committee of the Grower-GW Joint Research Committee, the film was produced by Phil Smith, retired GW director of agricultural research. Members of the movie committees are: Joe Alles, representing Montana; Howard Hart, Wyoming; Kish Otsuka, Colorado; Charles Reisig, Nebraska, and, representing Great Western, Waldo Peterson. Narration is by Evan Slack, Denver television and radio farm news reporter from Channel 7 and station KLZ.
CSU Ag Research on Sugarbeets Began Nearly a Century Ago

(EDITOR'S NOTE: This is the first in a series of two articles on the history of agricultural research at Colorado State University, with major emphasis on sugarbeets. The University was established as Colorado Agricultural College by the Territorial Legislature in 1870. The second installment will be published in the next issue. CSU's Office of Information and Public Services compiled the material in these articles.)

“When you’re dealing with living things, you have to take into consideration that they’re always changing.” This is how Dr. L. W. Durrell, dean emeritus, botany and plant pathology at Colorado State University, describes what research has been, still is and ever will be regarding development of the sugarbeet industry.

From the experimental growing of the first beets in Colorado in 1866 to the modern laboratories of today’s research scientists, the saga of the sugarbeet has been one of struggle, accomplishment, progress, and profits and losses.

Beginning was Trial, Error

What started as small and scattered experimental plots under severe weather and soil conditions, crop diseases and water shortages, has grown into a $100 million industry in Colorado. In the beginning it was trial and error pitted against sagebrush, Russian thistle, cactus, prairie dogs, insects and an unknown climate.

Science entered the picture in 1869 when F. L. Schirmer, a Denver metallurgist and chemist, began laboratory tests on beets. These tests, carried out in the old U.S. Mint in Denver, proved the suitability of Colorado’s climate and soil and the adaptability of irrigation farming to sugarbeet production, but many settlers remained convinced that mining and cattle production alone were Colorado’s future.

Union colonists settling in what later became Greeley were proving the skeptics wrong. They were successfully growing trees and crops and experimenting with irrigation. In 1871, the colony’s organizers said they considered Colorado to be "admirably adapted to growing sugarbeets."

The first official area sugar content test on sugarbeets was made in 1871. Schirmer sent a sample to the USDA in Washington. The beets were harvested by Peter Magnes, a Platte Valley (Nebraska) farmer, and were grown from German seed.

Two months later the USDA report came back—the samples averaged 14.5% sugar (compared to European averages of 11.42%, 11.09% and 12.05%, with the highest recorded at 14.78%).

In August 1879, the State Board of Agriculture, which had been established two years previously and became the governing body of the new Colorado Agricultural College (now CSU), was the first official group to underwrite agricultural experiments and research at the small Fort Collins land grant college.

Experiments began on wheat and corn and were followed in the next few years with tests of other crops. In one year, A. E. Blount, who came to assist the board in 1879 and who had been carrying on the College’s research program, tested 37 strains of beets.

Blount was assisted by others, including C. E. Ingersoll, who became the College’s second president in 1882; and James Cassidy and Elwood Mead, the College’s first trained horticulturist and first civil engineer, respectively. They conducted crop experiments after 1881 on what was then the campus’ 240-acre farm. They welcomed passage of the federal Hatch Act in 1888 which set the stage for experiment stations as departments of land grant colleges.

Experiment Station Established

The College’s experiment station was established in 1888 and went into beet research seriously in April when four varieties of beet seed, obtained from the USDA, were planted on a quarter acre. The station’s Bulletin No. 7 reported a wide variation of sugar content in the four types.

In 1890, the station’s Bulletin No. 11 reviewed experiments made at Medicine Lodge, Kan., provided information on the chemistry of beets and mentioned their feeding value.

Bulletin No. 14 reported on samples of beets grown elsewhere in the state as well as on a dozen varieties in the College garden. Altogether, 73 analyses were made. The Bulletin reported that estimates of beets grown in Germany showed an average yield of 14 tons per acre and an average sugar content of 12.55%. An average Colorado yield at that
time was reported at 26 tons per acre and a sugar average of 15%.

Bulletin No. 21 in 1892 reported that tests in the Arkansas Valley showed beets more practical to grow in Colorado than wheat. In 1897 the station sent seed (from Washington and Germany) to 611 farmers in 47 counties in the state.

Most of the sugar tests on these beets were made by USDA in Washington. They substantiated findings, in tests made at Fort Collins and at branch stations at Rocky Ford and Del Norte, that beets could be grown commercially for sugar in most parts of the state. Range of yield without irrigation was established at from nine to 22 tons per acre, with a sugar content from 11 to 18%.

Work at the College's experiment station covered every phase of sugarbeet production, including type of soil, time and depth of planting, time of plowing and sub-soiling, distance between rows and between plants in a row, quantity of seed, germination, cultivation, thinning, number of irrigations, varieties, tonnage, sugar percentages, ripening dates, fertilizing, freezing of beets, feeding beet by-products, effects of alkali, size of beets, loss in topping, and cost of growing and harvesting.

By 1900 there was optimism along the lines of the prediction farmer Peter Magnes made in a letter to the "Rocky Mountain News" 24 years earlier: "If we had sugarbeet factories in Colorado similar to the flour mills scattered around, so that farmers could raise beets and draw them to the mill and get them manufactured (into sugar) the same as we get grain manufactured into flour and meal, then I imagine Colorado farmers would produce more gold than all the miners in the mountains."

At the turn of the century, sugar factories were coming onto the scene; and N. R. McCreery, later Colorado district manager for The Great Western Sugar Co., credited work of the College experiment station in Fort Collins as having "a great deal to do with influencing capital to build the necessary factories for processing the crop and in providing farmers with the information as to the cultural practices necessary to grow the crop successfully."

Six sugar mills were constructed in Northern Colorado at this time and were incorporated in 1905 to form The Great Western Sugar Co. And, in 1910 Great Western's Experiment Station at Longmont was founded and worked closely with CSU in beet research.
Fall Nematode Fumigation Good

By Dr. KENNETH C. ELLIS
Plant Pathologist, Longmont Experiment Station

Soil fumigation for control of sugarbeet cyst and false root-knot nematode has been shown to be an economically sound practice in fields where large nematode populations exist.

Historically, soil fumigation has been done in the spring prior to planting. However, fall fumigation can minimize many of the problems, or potential problems, involved in spring fumigation.

Disadvantages of spring fumigation are as follows: A/ The time interval between optimum soil conditions for fumigation and planting time is often too short; B/ Too long a delay in planting causes a decrease in yield; C/ Inclement weather often prevents proper and profitable use of soil fumigants; and D/ Improper soil structure (compacting) may result if soil fumigation is done when the soil is too wet.

Compaction may happen in the spring when growers are in a hurry to complete all the practices needed to grow a good crop of beets. Poor soil structure is conducive to poor seedling emergence and seedling diseases.

Biggest advantages of fall fumigation are: A/ It can be performed when soil conditions are nearly optimum for nematode control; B/ The grower has more time in which to get the job done; and C/ Fields can be planted in the spring as soon as weather conditions permit.

There are enough options being offered this year by the GW-Growers Service Centers at Platteville, Colo., and Scottsbluff, Neb., that virtually every soil type can have a soil fumigation program developed for it. Wherever possible, plow-down application should be given careful consideration. This method of soil fumigant application allows a grower to perform two operations at once—saving both time and money. Fall plowing conserves moisture and improves soil tilth. Soil fumigation kits for plows are available through the Service Centers or can be constructed by the grower himself.

For those soils that are not conducive to fall plowing, soil fumigants can be applied to the unplowed fields in the conventional manner. In these cases, the fumigant is knifed into the soil and immediately sealed, in one operation. This same technique can be used on plowed ground if for some reason the grower does not choose to use the plow-down application method. Other options available to the grower this fall are deep tillage fumigant application and simultaneous fumigant application and bedding.

Observations over the past five years have indicated that soil fumigation can be effective, even when done during the winter. For instance, many times conditions are such that prospective beet fields can be fumigated in December or February. Our data indicate that soil temperature has little to do with efficacy of soil fumigants as long as the soil is not frozen to a depth of more than one to three inches. If soil is frozen much deeper than this, a good seal may be difficult to obtain. Use of soil fumigants in low temperature soils is being further investigated by the GW Experiment Station at Longmont.

For best results, fall fumigation should be done when the soil moisture content is below field capacity. The top few inches of the soil surface should be sealed or packed in some manner immediately following fumigation. When plow sole fumigation is practiced, the fumigant should be applied at the bottom of furrow. When fumigants are knifed in, the fumigant should be applied 12-14 inches deep and the shanks spaced 11-22 inches apart. Plow-down fumigation should not be practiced in those fields coming directly out of corn and into sugarbeets. Presence of the non-decomposed corn stocks prevents a good seal and fumigant is lost through the surface. Plow-down fumigation of fields coming out of beans, barley, etc. does not present any problems.

Until further observations can be made and analyzed, the standard rate of 15-20 gpa should be used. Company agriculturists should be contacted for recommendations for particular fields.

The Platteville GW Grower Service Center operated this Tote-Dempster broadcast fumigant rig last season in Colorado. It has 11 shanks fumigating 14" deep with acre counter.
Why Fall Fumigate Nematodes?

By H. W. LEMBRIGHT

(EDITOR'S NOTE: Mr. Lembright is senior development specialist with the Plant Science Research and Development Department of The Dow Chemical Co. in San Francisco, Calif. Telone is one of the fumigants used in control of nematodes and is a registered trademark of Dow Chemical Co.)

Fall fumigation can be as effective or better than spring fumigation in the control of sugarbeet nematodes. One of the reasons for this is that there is more opportunity to put the soil in a better condition for a good fumigation job. In order to understand this we need to review how fumigants move through the soil and how they kill nematodes.

A soil fumigant injected into the soil as a liquid changes to a gas or vapor and moves through the soil as a gas. Movement of the gas is through the continuous soil airspace but not through soil water.

However, as it moves through the soil air it also dissolves into the soil water and establishes a definite distribution of fumigant between the air and water phases of the soil. Actually, most of the fumigant ends up in the water as a toxic solution which is responsible for killing the nematodes.

The toxic solution is a concentration of the fumigant in water. If we define dose as the killing power of this mixture then dose might be represented by a simple formula. DOSE = CONCENTRATION × TIME.

As illustrated by this equation dose is not how many gallons of fumigant is applied per acre; it will, however, be influenced by the amount used. The objective in soil fumigation then, is to maintain a concentration high enough and for a period long enough to give maximum nematode control.

To further define dose, let us consider what might be required to give nematode control to a greater depth in the soil. First, if the fumigant is going to move from the point of injection in the soil down to the depth where nematode control is needed, the soil must have a good continuous airspace. This distributes the fumigant and gives the CONCENTRATION needed throughout the soil mass.

The TIME portion of the equation is satisfied by holding the fumigant in the soil for as long as possible. To accomplish this in a soil with a good continuous airspace, the fumigant should be injected 10-12 inches or more into the soil and then given a proper surface seal. A proper surface seal can be achieved by using a cultivapacker or similar farm equipment. Actually, under ideal soil conditions the depth of control will be far greater than just the increased depth of injection.

Two experiments were conducted to demonstrate the above. These experiments were established in fields infested with sugarbeet nematode. One field was a silt loam type soil with a high moisture holding capacity and the other was a sandy loam soil with only a moderate moisture holding capacity.

After harvest, both fields were worked up and ripped to a depth of about 30 inches. One half of each field was irrigated and the other half was left semi-dry with some soil moisture. Later, both fields were prepared for fumigation and treated with Telone soil fumigant. The fields were then planted several weeks after the fumigant was applied.

Data from these two experiments in which each treatment was replicated four times are presented in the following table:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Expt. A</th>
<th>Expt. B</th>
</tr>
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<tbody>
<tr>
<td>Space</td>
<td>Silt Loam</td>
<td>Semi-Dry</td>
</tr>
<tr>
<td>Airspace (0-18&quot;)</td>
<td>33%</td>
<td>19%</td>
</tr>
<tr>
<td>Soil Moisture</td>
<td>23%</td>
<td>34%</td>
</tr>
<tr>
<td>Field of beets (Tons/A)</td>
<td>15.7</td>
<td>15.8</td>
</tr>
<tr>
<td>Check</td>
<td>28.2</td>
<td>18.1</td>
</tr>
<tr>
<td>Telone 15 gpa</td>
<td>30.0</td>
<td>19.7</td>
</tr>
</tbody>
</table>

(Continued on next page)
In examining the data, it is evident that sugarbeet yields from the check plots were not influenced by the semi-dry or wet conditions in the fields of the same soil type.

However, beet yields were strikingly influenced by the soil airspace which existed in the fields in both experiments. The 20 gallons per acre rate of Telone soil fumigant gave a 10 ton per acre increase in semi-dry silt loam soil as compared to the wet soil. Also, in the sandy loam, yields from plots treated in the semi-dry condition yielded four tons more than those treated when the soil was wet.

Further, it is evident that the lower 15 gallon per acre rate of fumigant was more effective when applied to soil in semi-dry condition than the 20 gallon rate applied to soil in a wet condition. This was true in either soil type.

**Semi-dry Soil Best**

The silt loam soil in a semi-dry condition yielded 28 tons per acre with the lower rate of fumigant as opposed to a yield of 20 tons from the 20 gallon per acre rate applied to the same soil in a wet condition. A 5.4 ton yield differential was observed in the sandy loam soils.

It is apparent in these experiments that soil condition as related to soil airspace was more critical to fumigant effectiveness than was the amount of fumigant used.

The next consideration is the soil texture as related to soil airspace and in turn its influence on the effectiveness of the fumigant.

In the sandy loam soil, yields were higher from those plots which had been fumigated in a semi-dry condition as compared to those plots which had been treated when wet. This yield difference was only a 4-ton increase with the higher rate of fumigant. But the soil airspace in this soil type was quite high in both the semi-dry or wet conditions when fumigated.

On the other hand, examination of the data on yields from the silt loam soil show that the low airspace of 19% gave poor results.

Thus the yield increases obtained from the treatments applied to semi-dry silt loam soil are comparable to those increases obtained in the sandy loam soil.

These data then support the conclusion that silt and clay loam soils should be fumigated only when semi-dry as this results in higher and more continuous airspace in those soils.

A similar condition can occur in a sandy loam soil in the winter or early spring after a rain. As the soil approaches saturation or a wet condition and low airspace occurs and then even these soils cannot be effectively fumigated until allowed to drain.

The success of soil fumigation depends upon conditions existing at time the fumigant was applied. If a good airspace develops three or four days after application this still has not allowed the fumigant to move in the soil because it will already have been absorbed by other soil components.

A final consideration is temperature in the soil at the time Telone soil fumigant is applied. Laboratory studies indicate and field results have confirmed that Telone will control sugarbeet nematode and root-knot nematode as well at 35 ° F. as it will at 70 ° F. Thus the low soil temperatures encountered in the late fall are not critical as long as high moisture is not present. If both situations exist, as it can in the spring in many areas, then a poor fumigation job is likely to occur.

The chance of having higher continuous soil airspace in fall is greater than in the spring and this is the major reason why fall fumigation with Telone soil fumigant can be as effective or better than spring fumigation.
Ag Secretary Hardin At Greeley Centennial

Secretary of Agriculture Clifford M. Hardin helped Greeley, Colo., celebrate its 100th birthday on August 1 when he was the principal speaker at the centennial observance.

Having observed excellent sugarbeet and other crops and impressive cattle finishing lots as he drove from Denver, Hardin said, "These all provide solid evidence of how the people of Greeley and Weld County are contributing to the vitality of America's agricultural economy. They illustrate," he continued, "what can be achieved when farming and ranching are conducted as a modern business to make foresight and good management pay off."

The Secretary urged passage of the pending Agricultural Act of 1970, calling it "one of the most constructive farm measures in recent history." He touched on limitation of payments in the bill, adding that government payments "can be well justified." He said that people in agriculture are disturbed by the debate on limitations which "tends to distort the situation, creating inaccurate impressions."

Hardin stated that "commercial agriculture by and large represents healthy competition, risk-taking, free enterprise in the best American tradition. You have put it into action here and are doing a good job of it."

Food programs, said the Secretary, "show how everybody concerned—consumers and producers and taxpayers—can gain from an efficient, dynamic agricultural industry."

Something like that philosophy he continued, "guided the people of this region when Greeley was established 100 years ago" when "homeowners joined in getting agriculture off to a start. They transformed what they had been given into something of value so that in time the whole region and, indeed, the entire Nation benefited."

U.S. 8TH IN PER CAPITA SUGAR USE

The United States, first in total sugar usage, ranked eighth in per capita consumption in 1969 with 99 lbs. Far in the lead was Eire with 127 lbs., followed by the Netherlands with 120 lbs.

Other nations, in order, which exceeded America were Australia, United Kingdom, Denmark, New Zealand, and Canada.

Among the 25 leading nations of the world, India and China were lowest in per capita sugar consumption with 10 and 8 lbs., respectively.
Utilizing the Sugarbeet Top Crop

By LIONEL HARRIS and DONALD CLANTON*

Don't plow your sugarbeet tops underground. Pasture or ensile them for sheep or cattle feed. Give lambs all the beet top silage they will eat for best results in fattening rations. Feed cattle limited amounts of beet top silage (8 to 12 lbs. per head daily) or feed it with corn silage — equal parts of each. Beet top silage produces a much greater laxative effect in cattle than in lambs. It also stimulates urination in both lambs and cattle. Use plenty of bedding in the feedlot. Beet tops provide abundant feed for pasturing cattle or sheep, especially if favorable weather prevails during the pasture period.

Silage yields vary according to yields of beet roots, and crop rotation and fertilizer practices used in beet production. Adequate nitrogen produces large yields of tops. Excess nitrogen also produces large yields of tops but lowers sugar in the roots. We made about 9.5 tons of edible silage per acre (1,107 lbs. per ton of beet roots) from unwilted beet tops during an 8-year period at the Scotts Bluff Station. Wilted tops yielded about five tons of edible silage per acre.

Unwilted tops should not be ensiled in trench silos where the excess moisture can't drain away. Silage made from wilted tops can be stored in trench or upright silos. Production of wilted beet top silage is attractive to the average beet grower because he can harvest both roots and tops with the same labor crew. At proper intervals he can stop the harvest of roots to chop and ensile his windrowed tops. It’s better to ensile tops a little too green than to wait and let them become too dry.

Here's how to make beet top silage from wilted tops:

1/ Top the beets and make neat windrows containing tops from four to six rows of beets.

2/ Be careful not to drive trucks or beet root harvest machines over the windrowed tops.

3/ Allow tops to wilt in the windrow until they contain 60 to 65% moisture. Fresh green tops contain from 75 to 80% moisture. The rate of moisture loss from tops in the windrow depends on the weather and the type of top growth at harvest. Small, mature, light green tops will dry much faster than large, dark green tops. In most instances, beet tops in the windrow are ready to harvest for wilted silage four to eight days after you top the beets.

4/ Chop tops from the windrows and ensile them in trench, bunker, or upright silos, or in stacks. Cover the exposed forage with plastic to keep out air.

5/ Good beet top silage can be made without preservatives. The sugar in the crown provides carbohydrates for rapid fermentation.

6/ If tops become too dry (below 50% moisture) in the windrow, chop them and add water as they are ensiled. Packing will also aid in producing good silage from dry tops.

Beet Top Silage Tested

Lambs fed beet top silage in tests at the Scotts Bluff Station gained as well or slightly better than those fed corn silage. (Table 1) Cattle fed large amounts of beet top silage gained at a slower rate and required more feed per pound of gain than those fed corn silage. (Table 2) When beet top silage and corn silage were fed as a mixture cattle gained about the same as when they received corn silage as the major roughage. (Table 3) Calves pastured on beet tops, and fed 2 lbs. of corn and 3 lbs. of alfalfa hay daily gained 24 lbs. on the tops from each ton of beet roots, compared with 33 and 38 lbs., respectively, when they were fed unwilted, and wilted beet top silage. (Table 4)

(See tables on next page)

*Lionel Harris is superintendent of the Scotts Bluff Station at Mitchell, Neb., and Donald Clanton is professor of animal science at the North Platte Station. Both stations are operated by the University of Nebraska College of Agriculture.
Table 1. Relative feeding value of corn silage and beet top silage for fattening lambs. Scotts Bluff Station.

<table>
<thead>
<tr>
<th></th>
<th>Corn silage</th>
<th>Beet top silage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average daily gain,</td>
<td>0.42</td>
<td>0.44</td>
</tr>
<tr>
<td>pounds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average daily ration, pounds</td>
<td>1.74*</td>
<td>1.74*</td>
</tr>
<tr>
<td>Corn silage</td>
<td>3.14</td>
<td>6.19</td>
</tr>
<tr>
<td>Beet top silage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dry matter less ash</td>
<td>2.32</td>
<td>2.51</td>
</tr>
<tr>
<td>Feed per cwt gain,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>pounds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concentrate</td>
<td>415</td>
<td>398</td>
</tr>
<tr>
<td>Corn silage</td>
<td>750</td>
<td></td>
</tr>
<tr>
<td>Beet top silage</td>
<td>1,419</td>
<td></td>
</tr>
<tr>
<td>Dry matter less ash</td>
<td>552</td>
<td>570</td>
</tr>
</tbody>
</table>

*Concentrate = Grain mixture (50% corn, 50% beet pulp pellets), 1.14 lb.; soybean meal, .10 lb.; and dehydrated alfalfa, .50 lb.

Table 2. Relative feeding value of beet top silage and corn silage for finishing cattle. Scotts Bluff Station.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Beet top silage</th>
<th>Corn silage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of steers</td>
<td>37</td>
<td>39</td>
</tr>
<tr>
<td>Average weights, pounds</td>
<td>724</td>
<td>718</td>
</tr>
<tr>
<td>Initial</td>
<td>2.36</td>
<td>2.78</td>
</tr>
<tr>
<td>Average daily gain, pounds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concentrates¹</td>
<td>17.1</td>
<td>17.1</td>
</tr>
<tr>
<td>Beet top silage</td>
<td>35.6</td>
<td>26.5</td>
</tr>
<tr>
<td>Corn silage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feed required/cwt gain, pounds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concentrates</td>
<td>725</td>
<td>615</td>
</tr>
<tr>
<td>Beet top silage</td>
<td>1,508</td>
<td>1,025</td>
</tr>
<tr>
<td>Corn silage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dressing percent²</td>
<td>60.8</td>
<td>62.8</td>
</tr>
<tr>
<td>Carcass score</td>
<td>16.6</td>
<td>17.3</td>
</tr>
</tbody>
</table>

¹Started on 50% ground shelled corn and 50% dried beet pulp pellets and changed to 65% corn and 35% beet pulp during the latter half of the experiment. Each steer received two pounds of dehydrated alfalfa pellets and 0.5 pounds soybean meal daily.

²Hot carcass weight divided by slaughter weight x 100.

³15, 16 = high, average and low choice, respectively.

This will be a familiar sight throughout GW territories this fall. The straw chopper-blower in the photo is applying a layer of straw on the side of a beet storage pile. More than 50 piles will be covered with layers of straw varying from six to 18 inches thick to protect the beets from surface dehydration and excessive freezing and thawing. Limited tests in 1969 gave encouraging results.

Table 3. Feed value of corn silage and wilted and unwilted beet top silage and corn silage mixtures for finishing cattle (Experiment 2 and 3). Scotts Bluff Station.

<table>
<thead>
<tr>
<th></th>
<th>Corn silage</th>
<th>Unwilted beet top silage</th>
<th>Wilted beet top silage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg. weights, lbs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial</td>
<td>800</td>
<td>804</td>
<td>801</td>
</tr>
<tr>
<td>Final</td>
<td>1,203</td>
<td>1,219</td>
<td>1,196</td>
</tr>
<tr>
<td>Daily gain</td>
<td>3.10</td>
<td>3.19</td>
<td>3.03</td>
</tr>
<tr>
<td>Avg. daily feed consumption, lbs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grain mix</td>
<td>15.6</td>
<td>15.4</td>
<td>15.3</td>
</tr>
<tr>
<td>Corn silage</td>
<td>26.4</td>
<td>17.4</td>
<td>15.3</td>
</tr>
<tr>
<td>Wilted beet tops</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dehydrated alfalfa</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Carcass grade*</td>
<td>16.6</td>
<td>16.6</td>
<td>16.4</td>
</tr>
<tr>
<td>Avg. weights, lbs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial</td>
<td>720</td>
<td>733</td>
<td>750</td>
</tr>
<tr>
<td>Final</td>
<td>1,129</td>
<td>1,126</td>
<td>1,124</td>
</tr>
<tr>
<td>Daily gain</td>
<td>2.92</td>
<td>2.81</td>
<td>2.67</td>
</tr>
<tr>
<td>Avg. daily feed consumption, lbs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grain mix</td>
<td>15.6</td>
<td>15.8</td>
<td>15.4</td>
</tr>
<tr>
<td>Corn silage</td>
<td>22.6</td>
<td>16.4</td>
<td>14.3</td>
</tr>
<tr>
<td>Wilted beet tops</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dehydrated alfalfa</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Carcass grade*</td>
<td>16.4</td>
<td>16.8</td>
<td>16.8</td>
</tr>
</tbody>
</table>

*15 and 16 = high good and low choice, respectively.

Table 4. Beet top silage yields and performance of calves fed silage or pastured tops. 3-Year average. Scotts Bluff Station.

<table>
<thead>
<tr>
<th></th>
<th>Wilted tops</th>
<th>Unwilted tops</th>
<th>Pastured tops</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beet root yield, tons*</td>
<td>71.0</td>
<td>81.5</td>
<td>60.7</td>
</tr>
<tr>
<td>Edible silage per ton</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>of beets, lbs.</td>
<td>618</td>
<td>1,007</td>
<td></td>
</tr>
<tr>
<td>Initial weights of</td>
<td>426.1</td>
<td>423.4</td>
<td>432.2</td>
</tr>
<tr>
<td>calves, lbs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daily silage consump-</td>
<td>21.4</td>
<td>35.7</td>
<td></td>
</tr>
<tr>
<td>tion, lbs.**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daily gain</td>
<td>1.34</td>
<td>1.07</td>
<td>1.18</td>
</tr>
<tr>
<td>Gain on tops obtained</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>from 1 ton beets</td>
<td>38</td>
<td>33</td>
<td>24</td>
</tr>
</tbody>
</table>

*3-year average total yield of beet roots from which tops were obtained for the three treatments. Beets yielded about 20 tons of roots per acre each year.

**In addition to silage or pasture, calves received two pounds of corn and three pounds of alfalfa per head daily.

WORLD SUGAR OUTPUT AT NEW HIGH

World production of centrifugal sugar reached a new high of 79 million short tons, raw value, in 1969-70, according to USDA's July "Foreign Agriculture Circular."

Cane sugar, with a 12% increase over the prior year, accounted for 46.6 million tons, or 59%. Beet sugar, declining 4% from 1968-69, totaled 32.4 million tons, or 41%.
Gerald Dick of Sterling, Colo., carefully harvests his beets in a field next to the Sterling factory. His topper is behind him windrowing the next rows of beets for the future pasturing of young feeder cattle.

Harvesting Clean Beets and Tops
Objectives of Colorado Grower

By LLOYD CROOK
Sterling Agriculturist

When Gerald Dick of Sterling, Colo., harvests his sugar beets he has two objectives clearly in mind: delivering them to the factory in a clean and trash-free condition and harvesting the tops for maximum feed value.

Gerald farms on Company land at Sterling and for the Harris Livestock Co. He raises 70 to 80 acres of sugar beets annually and generally has an excellent crop.

He says the value of his beet tops has tripled since he started windrowing them with a top saver. After harvest, about 250 to 400 head of 500-lb cattle are turned into his beet fields. He also feeds roughage from some 100 acres of corn and 60 acres of alfalfa. The cattle are left in the fields for about 60 days and gain about 1 1/4 lbs. per day. Sometimes supplemental feed, hay or corn silage, is used if the feed runs short. The warmed-up animals are then put in the feedlot for fattening.

When asked for pointers on harvest, Gerald says he starts out in the spring aiming for delivery of clean beets to the receiving station in the fall.

Planting is important and good "guess" rows are necessary for a loss-free harvest. Elimination of weeds conserves moisture and fertilizer and makes harvesting easier. The Sterling grower says he has been fumigating for nematode control the past three years with the increased tops alone probably paying for the fumigant. He used Ro-Neet as a pre-plant herbicide and applied Treflan as lay-by on more than 30 acres this year.

Gerald makes every effort to have his ground just right at harvest time—neither too wet nor too dry. When wet, excess soil mingles with the harvested beets, and when dry ground is encountered, beets break and tips are left in the ground. A cleaning screen on the beet puller helps under wet conditions, as does a new-type cleaning cart.

Gerald says harvest equipment can be run too fast or too slow for an optimum job. There is a right speed for every condition of the field. The same is true as to depth in running puller wheels. The tendency is to run too deeply, resulting in excess soil handling.

To get all of the beet the equipment must stay in the row. If a grower loses two ounces per beet through breakage and has an 80% stand, the loss is 1.2 tons per acre. Gerald says a row finder is a paying proposition and adds that some of the major problems encountered with these devices are due to poor adjustment.

In the majority of cases if a grower starts his harvest in the spring with careful planting and chemical weed control and then follows by properly preparing his fields and harvest equipment, there is no reason why all of the sugar beets delivered can't be clean and relatively free of foreign matter.
Late summer and fall are important times for sugar beet grower Walt Nygren of Johnstown, Colo. Even before his 1970 beets are out of the ground, Walt is preparing for his 1971 crop.

This year he will be harvesting his 26th crop of sugar beets knowing he has done just about everything he can to produce a good crop.

The Johnstown grower has come a long way since he first started growing beets on land that had been yielding 11 tons to the acre. He has been in the High Ten eight times, with 26.86 tons to the acre in 1969. He has consistently produced beet crops in excess of 22 tons the past few years.

Walt farms 200 irrigated acres and 255 acres of dryland on his own and 160 acres in partnership with his brother, Frank Jr. There are 90 acres of sugar beets—53 acres at Johnstown and 37 acres on the partnership land near Walker receiving station.

Crop rotation includes alfalfa for four years, corn one year and then beans, beets, barley and back to beets before planting alfalfa again.

Walt and his landowner, Glenn Chandler of Fort Collins, feed about 500 cattle annually. Beet tops are carefully harvested each year and usually siloed separately from green hay and corn silage.

The tops are chopped and mixed with the other silage just before feeding. Usually light cattle are fed and the chopping of tops helps prevent a possible choking problem. As part of their balanced ration, Walt feeds one to two pounds of beet pulp pellets each per day. He says the pellets are a good conditioner.

Bean and barley ground going into beets will be worked this fall. Walt recommends the use of barnyard manure and a 16-48-0 application of fertilizer on his heavy beet ground ahead of plowing. He says it is a poor practice to put manure on his heavy ground in the spring.

Late summer and fall field work helps cut down the amount of preparation required in the spring when rains can delay planting. Walt’s fields are usually planted in early April with a minimum of surface work so as not to disturb winter’s carryover moisture.
The Grower-GW Joint Research Committee took on an international aspect this summer when several of its members visited Canada as part of an extensive sugarbeet field inspection tour which also included the Billings and Lovell areas.

Guests of Canadian Sugar Factories, Ltd., the group, which also included other GW growers and key Company officials, visited the government research station at Lethbridge on June 4 and then inspected several beet growing farms in southern Alberta.

Committee members, in the words of Harlan Seaworth, noted that "Canadian cultural methods are quite similar to those in GW areas and problems are also about the same." Some equipment was identical while others were of European manufacture. Herbicides and quantities used in Canadian beet fields were about the same as in the United States.

Previously the group, including John Hall and Peter Bergen, of Canada, had toured state research stations and beet farms in Montana and Wyoming. Arrangements there were in charge of Ralph Hettinger and Charles Johnson, GW agricultural managers at Billings and Lovell.

Principal observations in Montana and Wyoming were of planter and herbicide tests. The former, conducted under the auspices of the Research Committee, were undertaken to observe relative efficiency of various beet drills. The latter, GW Plan II tests, are being made to try more nearly to pinpoint ideal rates of application of most chemicals labeled for sugarbeets, on different soil types and weed species, under weather variables found in the different GW areas.

The two series of tests in the Billings and Lovell areas were conducted by Company agriculturists, under
Montana State University, Company representatives, growers and Canadian sugarbeet researchers during the tour.

Research Group

on and U. S. Beets

PETERSON, 
Co-Chairman

the direct supervision of assistant agricultural managers Jerry Reed and Stan Walter.

Dramatic evidence of the effectiveness of herbicides was noted on the Wayne Hofferber farm near Pompeys Pillar, Montana. A nozzle plugged on Wayne's sprayer for a couple of rounds, and the three weedy rows which received no chemical stood out like a sore thumb.

Other beet farms inspected in Montana were those of Charles Hoskins, Kenneth Foos, Theodore Birkland, Gordon Aisenbrey, Burt Walter, Herman Sian, Wilbur Oblander, Don Robertus, Phillip Frank, William Lackman and Elmer Kembel. A stop was also made at the Huntley Branch Experiment Station of Montana State University.

In the Lovell area inspections were made at the farms of Leonard Leonhardt, Harvey Bush, William Fink, George Wambeke, Arthur Martens, Raymond Rodriguez, C. H. Shumway, John Krause, Donald Bergner and William White. A stop was also made at the University of Wyoming Experiment Station at Powell.

Grower members of the Research Committee and other GW beet producers who made part or all of the inspection tour were Kish Otsuka, co-chairman; Ole Johnson, Elmer Gustafson, Frank Barnes and Harlan Seaworth of Colorado; Joe Alles, Babe Yost and Leo Bratsky, of Montana; Charles Reisig, Harry Weber and Kenneth Carpenter, of Nebraska; and Paul Rodriguez, Christ Simon and Dennis Smith, of Wyoming.

GW was represented by Drs. Thomas Army and Robert Oldemeyer, Ralph Wood, Ed Sullivan, James Widmer, Robert J. Fisher, and the writer, from the Denver office and Longmont Experiment Station.

Also participating in part of the U. S. portion of the tour were Dr. M. J. Burris and Donald Baldridge, of the Montana State University Agricultural Experiment Station; Warren Smith, of the Wyoming State Experiment Station; and William Eckerdt and Harold Hurich, Big Horn and Park, Wyoming county agents.

Canadian-American group on Lethbridge (Canada) Experiment Station

Visiting herbicide sequence application experiment aiming at complete elimination of field labor on a Canadian beet farm.

Committee members inspect drill trials and herbicide plots in Montana's Yellowstone Valley.
The Weld County booth took third prize at the Colorado State Fair in Pueblo. In charge of designing and operating the booth, which promoted the county's sugarbeet industry, was Chuck Urano, right, county horticulturist. Standing in front of the booth are, L to R: Jim Polhamus, summer Extension Service employee; Nancy Rains; Elmer Rothman, county agronomist; Mrs. Rothman; Diane Vangraefschepe; and Charlotte Box. The Misses Rains, Vangraefschepe and Box helped with daily operation of the booth.

This GW booth drew crowds at the Scotts Bluff County Fair in Mitchell. Shown running the booth are Crysto Sato, Nancy Rudolph and Ellen Sato, L to R. The Sato sisters are daughters of beet grower and Mrs. Paul Sato of Mitchell and Nancy is the daughter of Gordon Rudolph, Mitchell agricultural manager.
Wyoming Governor Sets State 'Sugar Beet' Month

In recognition of the American sugarbeet industry's 100th anniversary, Gov. Stanley K. Hathaway has by proclamation designated October as "Sugar Beet Month" in Wyoming.

He cited the fact that "the U.S. beet sugar industry has become the largest single source of sugar for America's households and for the nation's vital food processing industry."

The Wyoming governor pointed out in his proclamation that the beet industry in his state "provides economic opportunity for hundreds of growers and farm workers on sugarbeet farms, and for hundreds of workers employed in processing facilities."

CUBAN RECORD SUGAR CROP COSTLY

Cuba's record 1970 sugar production of 8.5 million metric tons, 1.5 million tons short of Dictator Castro's goal, was extremely costly. The Cuban minister of labor recently reported that due to low productivity of workers, the sugar cost perhaps three times as much as its value on the world market.
Scotts Bluff Station Researchers Praised

Agricultural research work at the Scotts Bluff Station has been a "great and tremendous asset to farmers," John R. Jirdon, Morrill, Neb., pioneer, said in his keynote address during the station's annual field day at Mitchell.

He told hundreds of farmers, townspeople and others present that there is no way to calculate in money the value of the work done at the farm in development of the North Platte Valley.

Jirdon, who is a sugar-beet landowner, said the beet crop is basic to the area's economy, but that the need to keep farming diversified will always be important.

He added that livestock is, and will continue to be important to Valley agriculture. A long-time livestock feeder, Jirdon said the huge amount of roughage growing in the area can best be utilized through livestock feeding.

Pointing out that livestock operations have changed and that fattening of animals is better left to specialists, Jirdon explained that farmers can make good use of growing livestock for extra income and to maintain fertility on the farm.

Jirdon praised the work carried out over the years by Lionel Harris, station superintendent. Harris, who plans to retire June 1 after 40 years at the station, welcomed the visitors to the annual field day.

A key stop on a tour of the station's research projects was a plot where Dr. Gary Peterson, University of Nebraska assistant professor of agronomy (soils), discussed sugar-beet fertilization.

Peterson explained that herbicides should be combined or rotated to control a wider spectrum of weeds and reduce a buildup of any particular herbicide in the soil. Some crops such as sugar beets or beans have little tolerance to certain herbicides, so crop rotation should be considered in selecting a herbicide.

Ron Stieb of Lexington, Neb., operates the 3-row Hesston harvester he and his father used to bring in their 1969 High Ten crop of beets. Their 146 acres produced 2,724 tons of sugar beets at an overall average of 19.3 tons per acre, with two contracts going over the 20-ton mark. They use a 5-row Hesston top saver at harvest time. When the weather turns bad they dual up the tractor, harvester and top saver to get in the crop.—Photo by Roeland Elliston, Ovid agriculturist.
Wife Insists on Cleaner Beets

Neeland Siebring of Kersey, Colo., and the second member of his beet harvest crew, (his wife, Norma,) had a meeting of minds during the muddy 1969 campaign.

Neeland, a Hardin area pioneer in the use of a grab-roll screen on his harvester, bought a new International without this cleaning device in 1969. And, he says Norma threatened never to haul beets again unless he used a grab roll. It seemed she had a terrible time fighting dirt and scraping muck off the truck.

One of the area’s more progressive beet growers, Neeland believes in utilizing every aid he can get to raise good beets. He believes in proper crop rotation and the use of chemicals for weed control.

He says that for years he had been fighting mud and trash in delivering clean beets. Then he noticed a story in “Through the Leaves” on the success of grab rolls in Montana.

He contacted Sven Johansen, Greeley agriculturist, and Waldo Peterson, then agricultural manager at Greeley who had formerly worked in Montana. Waldo put him in touch with now retired agriculturist Tom Mullowney in the Worden district of Billings factory.

Neeland, a graduate of Colorado State University with a major in agronomy, came back from Montana with complete plans for building a grab-roll screen. This was in March and by harvest time he had a working grab roll on his 1-row harvester.

It wasn’t long before many of his neighbors were following his example after seeing how much cleaner his beets were on delivery at Hardin receiving station.

The 1969 harvest furnished the concluding proof on just how valuable a grab-roll screen can be. Neeland is now modifying his new harvester for a grab roll. He explains, “it not only makes cleaner beets but it helps keep harmony around the household.”

Neeland farms 80 acres of his own and another 80 acres for his mother-in-law, Mrs. Anthony “Nellie” VanWyke. He has 49 acres of sugarbeets this year. He grows beets in rotation with corn and pinto beans. This is about the ninth year for this rotation. Neeland spring plows his beet ground and plants picking corn.

His beet tops and corn residue are pastured to about 1,500 to 1,800 lambs. After the lambs get through with the corn stalks the residue is chopped and plowed under in the fall. Beans are planted the following spring.

The bean ground is plowed in the fall to help cut the amount of work required in the spring when planting beets.

Rotation and use of chemicals have been good for the farm’s weed control. Neeland says beets following beans is the best way to go. Eptam and Treflan are used on the beans—a pint of Treflan and a quart of Eptam per acre on Neeland’s moderately heavy clay loam soil.

The Kersey grower prefers to use well water to irrigate up his beets—ditch water has too many weed seeds, he claims. Sixteen out of the past 20 years, Neeland has had to irrigate up. And, Ro-Neet in a 7-inch band helps prevent weeds from getting out of hand.

When this story was written, Neeland reported he had one of his finest and cleanest crops coming up. If all goes well at harvest time the Siebrings will deliver a good crop of clean beets to Hardin receiving station and both Neeland and Norma will be happy.
Molasses on Alfalfa Helps Cut Shrinkage

By JOHN SHERMAN
Billings Agriculturist

Harvesting of alfalfa and ensiling it in the "wilt stage," or when containing about 65% moisture, is becoming popular in many areas. So it is west of Billings, Mont., on the Yost Farm Co. spread.

They harvested the first and second cuttings from 70 acres of alfalfa and by actual weights have 1,300 tons of haylage this year.

This is the Yost brothers' fourth year of siloing this crop and Ishmael "Babe" Yost emphasizes the importance of adequately packing as it is being placed in the silo. "When it is firmly packed like corn silage it will come out at feeding time packed looking like tobacco," Babe says. The Yosts add a pound of preservative per ton while placing in the pit.

To reduce the 25% shrink they experienced on last year's haylage, the Montanans have added 23 tons of beet molasses as topping over the first cutting. Then their second cutting was placed directly on top of the first and an additional 23 tons of molasses sealed the pile for curing until time for feeding.

So there is no guessing about their feeding ration, the Yosts had the haylage analyzed and found protein will be from 17 to 22%. They usually start feeding about four pounds per day and taper off to about one and one-half pounds at the end of fattening time. And the results are excellent.

Cleaning Tools Help Montanans Harvest

By BOB L. PIERCE
Billings Agriculturist

As we approach the 1970 harvest season, the lessons learned from the tough 1969 harvest should be recalled. While it is hoped we never have a recurrence of last year's misery, harvest equipment should be capable of working under the toughest possible conditions.

Growers who take time to sharpen, adjust and maintain their equipment are usually able to deliver clean beets. Storage of clean beets means better keeping quality and higher sugar extraction.

Many acres of beets are raised on heavy soils in the Billings factory district. A good grab-roll cleaner, such as the Space Flite, is essential on a harvester. Without such cleaners, many tons of beets wouldn't have passed over receiving station equipment in 1969.

Growers who haul to the Mann station are 100% equipped with grab-roll cleaners. The average tare at the station for 1969 was considerably less than factory average. This is a remarkable accomplishment considering the heavy soil so common to the area.

A large number of Billings growers have harvesters equipped with cleaning devices. With these devices, they can truck clean beets to the station and are not burdened with large amounts of return dirt. Hauling and handling dirt, tops and weed roots that should be left in the field costs time and money.

We are confident all growers in the Billings district will again take the necessary steps to deliver clean beets this harvest.
U.S. Out-Yields USSR in Beets And Most Crops, Study Shows

By ROBERT J. FISHER
Vice President—Grower and Government Relations

American yield of sugarbeets per acre, as in the case of most crops, exceeds Russian output, according to a recent statistical comparison prepared by the USDA Economic Research Service.

U.S. beets yielded 17.1 tons per acre in 1967, or almost 1.7 times as much as USSR beets that year, with 10.2 tons. Total beet acreage in Russia was 8.3 times that in America, but USSR beet production was only five times greater. Russia is the world’s largest producer of sugar, as well as beet sugar by itself.

Of 16 crops for which comparative data were published for 1967, only cotton, sunflower seed, and citrus fruits had greater per acre yields in Russia than in America.

USSR Land State Owned

“All land in the USSR is Government-owned and nearly all is socialized,” according to the USDA study co-authored by Jerome A. Levine and Paige I. Bryan. Collective farms account for more than half of the total planted acreage. The 3% of the total agricultural land operated privately (auxiliary farm units attached to state enterprises) produce about a third of the nation’s farm output.

“Functions of management are difficult to compare because of differences in the size of Soviet and American farms,” according to the USDA report. American farms are much smaller than Russian units. Soviet farm managers are not fully responsible for making economic decisions directly affecting output and profits. Bureaucratic directives, rather than independent decisions, usually control.

The USDA pamphlet reported that “recent Soviet interest in cost accounting and in profitable farm operations suggests a trend toward more managerial autonomy in the actual production process” of Russian farms.

Other significant comparisons noted by Messrs. Levine and Bryan or shown in extensive statistical tables in the report are:

1/ U.S. uses less farm labor and land but more capital to achieve greater output.
2/ As of January 1, 1968, American farmers had 4.8 million tractors and 3.1 million trucks versus 1.7 million tractors and 1.1 million trucks on USSR farms.
3/ In America 6.6% of the total work force is employed on the farm versus 35.2% in Russia.
4/ American farmers use 97 lbs. of commercial fertilizer per planted acre while only 33 lbs. are used in Russia. Usage is in terms of principal plant nutrients.
5/ Plantings per farm in America average 95 acres; in USSR they are 7,031 acres on collective farms and 17,050 acres on state farms.
6/ In America there is one farm worker for every 59 planted acres; in Russia one worker for every 17 sown acres on collective farms and one for every 28 planted acres on State farms.

The USDA publication pointed out that comparison of U.S. and Soviet agriculture for a single year may be somewhat misleading because of vagaries of weather. The pamphlet, however, failed to note that earlier studies by USDA also showed a decided edge for American agriculture over Russian farming.

For example, 1966 yields showed U.S. sugarbeets averaging 17.5 tons per acre against 8.7 tons for the USSR. In that year Russia’s sunflower seeds and cotton again out-yielded the U.S.

Copies of the most recent study, published last December, ERS-FOREIGN 286, may be obtained by writing U. S. Department of Agriculture, Economic Research Service, Washington, D. C. It is entitled “Agriculture in the United States and the Soviet Union.”
Lloyd Crook, Sterling agriculturist, was giving Steve Torrez a few pointers on how to weed his eight acres of FFA beets when he got carried away. They both laughed when the slip of the hoe got a healthy beet. The youth’s sugarbeets will help pay his way in Northeastern Junior College at Sterling this fall.

Forrest Waitley of Sterling, Colo., right, and Bob Vergara, Sterling agriculturist, examine pre-harvest samples of sugarbeets in the Jessica station grower’s field. Mid-July and late summer samples are taken to help Company management plan the length of campaign required and quantities of operating supplies needed. Randomized sampling is not to get an estimate of yields in any given field but to show Company-wide indications. Forrest has 66 acres of beets.

Colorado FFA Youth Asset to Agriculture

At a time when we hear so much about youth activists, protesters, hippies and yippies, it is refreshing to meet a young man like Steve Torrez of Sterling, Colo. Steve is the son of Mr. and Mrs. Lupe Torrez, who farm in the Sterling factory district.

Steve won one of four $200 Union Pacific scholarships given in Colorado this year. The scholarship is based on leadership ability and scholastic achievement. H. R. “Hy” Buescher, Steve’s vocational agriculture teacher, says the winner of the Future Farmers of America State Farmer Degree has been an outstanding student.

As a sophomore, Steve was an average student but from there on he improved so rapidly he has been by-passing about 25 students per quarter in grade-point standing. Buescher says time ran out or Steve would have graduated in the top 10% of his class— as it was he ranked 54th in a class of 250.

The young Coloradan has had FFA sugarbeet projects the past three years, in addition to beef and sheep fattening; hog, sheep and beef breeding, and horse raising. Horses and rodeos are his hobbies. He competes in rodeo bull riding events.

Sugarbeet raising is a heritage for Steve. His grandfather came to the Sterling area from Mexico to work beets in 1924 — his passport cost him one cent. Steve’s father was born at Padroni and worked in sugarbeets all his life.

Steve’s dad started farming on his own six years ago and has expanded his operations to 260 acres of irrigated land. The Torrez farm is a family operation with the four boys and two girls having their share of work to do. They are a close family and bi-lingual. This type of environment has contributed much to Steve’s achievements.

Steve does most of the tractor work on his 8-acre FFA beet project and it is a clean, thrifty-looking crop. He irrigated it every week to attain maximum growth.

Proceeds from the beet crop and the scholarship will help pay Steve’s expenses at Northeastern Junior College this fall. He plans to go on to Colorado State University and study agricultural education after completing two years at Northeastern. He is an asset to agriculture. — Lloyd Crook, Sterling agriculturist.
The 1969-70 farm-feeding season has definitely proven to many of us that livestock should be included in some manner with irrigated agriculture in our beet-growing areas.

In the first place, feed crops must necessarily be grown in rotation with sugarbeets on a majority of these farms. A cash market exists for sugarbeets. But, tops and other feed crops are usually more difficult to sell and to realize an adequate return per acre—at cost of production plus a profit to the producer.

If these feed crops can be consumed by livestock on the farm, the by-products of the beet crop are actually “sold” at the same time.

Recent livestock prices have been at a fairly high level, and some growers feel they are too high to buy. But, demand for red meat increases as the general public becomes more affluent. It is our guess that after people learn to enjoy the taste of properly fed U.S. high grade lamb and beef, these meats will be among the last products the consumer will be willing to give up.

We acknowledge the fact that livestock prices fluctuate. If a grower is out of the livestock business when prices go down, of course, he will not take the loss that some other feeder may be taking. On the other hand, if a farmer has no livestock when the prices go up, he will not benefit therefrom.

There is no group of people in the western United States which has a more inherent right to own and fatten livestock than beet growers. They have feed to sell, not only from their beet crop but from the crops they grow in rotation.

Let's remember that the bulk of the feed on these farms is of a roughage nature. Properly supplemented roughage is the ideal ration for growing young animals.

These young animals produce the highest quality beef known anywhere in the world, when given proper care, fed a balanced ration based largely on the supply of roughage grown on the farm, and properly finished on a high-energy ration.

Livestock feeding began in this part of the country before 1910 as a result of the presence of alfalfa hay and sugarbeet by-products. Throughout the following 60 years it has been profitable most of the time to “sell” these products through livestock.

We contend that this is still true and seek to encourage the consumption of farm-grown feeds by livestock on the beet-growing farm.

Sugarbeet farming and livestock feeding go hand in hand and tend to stabilize the risks of operating today's modern farm. Feeding year-round is customary on many sugarbeet farms today where seasonal feeding was practiced in the past. Beet tops, such as those shown above, and by-products from the root, help make this possible.
Cheryl Nygren, 21-year-old daughter of beetgrower and Mrs. Walt Nygren of Johnstown, Colo., graduated from Colorado State University this year with a major in social sciences.

The lovely Roosevelt (Johnstown) High School graduate is active in the Johnstown Order of Rainbow for Girls and is past worthy advisor of the Order of Rainbow assembly. She was active in Kappa Kappa Gamma at CSU.

Floyd E. Merrill, long-time editor of the Greeley Tribune until retirement in 1960, died in June after a brief illness.

A third generation newspaperman, Merrill was born in Iowa and graduated from Brighton, Colo., High School and the University of Colorado. He came to Greeley in 1916 and became editor of the Tribune in 1917.

John R. Jirdon, Morrill, Neb., sugarbeet landowner and prominent Nebraska businessman, has been awarded the University of Nebraska’s highest service recognition, the Nebraska Builder Award.

Jirdon, son of a pioneer family which homesteaded near Morrill, is currently president of six corporations. He is vice president of the First National Bank of Morrill and a director of the Omaha National Bank.

Gabriel Alan Fritzler, son of Mr. and Mrs. Gabriel Fritzler of Fort Morgan, Colo., is an alternate for the Union Pacific scholarship this year, according to C. W. "Bill" Jones, Fort Morgan agriculturist. The youth has a 21-acre beet contract on the Melvin Aker farm this year. He took second place in 1969, first in 1968 and first in 1967 in the district FFA sugarbeet growing contest. He graduated from Fort Morgan High School this year with a 3.4 average and is enrolled at Colorado State University.

Mrs. Bessie "Bess" M. Mann, 76, wife of the late former assistant agricultural manager at Billings, Mont., Charlie Mann, died June 30 in a Pendleton, Ore., nursing home.

She was born in Iowa Nov. 20, 1893 and moved to Montana in 1905 where she taught school on the Huntley Project where she met Charlie. They were married in 1915 and moved to Billings in 1923. Mann receiving station, between Worden and Pompey's Pillar, was named after Charlie who died in 1954.

Dan Martin, left, and David Yetter, members of the Pierce Ag 4-H Club won the senior team 4-H contest July 17 at the 4-H building in Greeley. Their demonstration was "No Weeds, Better Beets." Dan is son of beetgrower and Mrs. Wilbert Martin of Ault, Colo., and David is son of beetgrower and Mrs. Dwain Yetter of Pierce. ("Ault Progress" photo)
Linda Giauque, daughter of Kemp agricultural manager and Mrs. Lowell E. Giauque, of Goodland, Kan., graduated summa cum laude from the University of Northern Colorado at Greeley.

She was presented the Hanna Award and $200 upon graduation. The award is made for academic excellence and leadership as an outstanding senior.

She belonged to and took an active part in the following honoraries: Lambda Sigma Tau, science and math; Pi Mu Epsilon, math; Pi Lambda Theta, women's education; and Gold Key, senior women's honorary. She signed a contract to teach high school math in Austin, Minn., this fall.

Wyoming Gov. Stan Hathaway highly praised the more than 400 Future Farmers of America attending the 1970 FFA state convention in Buffalo. He said they were "some of the finest young men in Wyoming."

"When I see boys like you, I have great faith in the future," the Governor said at the convention banquet. He urged them to take active interest in local, county, state and federal legislative activities.

Wyoming FFA officers and their home towns are: Clayton B. Marlow, Laramie, president; Larry Prager, Douglas, vice president; Jim Bennage, Lander, secretary; Jim Briddle, Shoshoni, treasurer; Matt Brown, Thermopolis, reporter; Wylie G. McGuire, Wheatland, sentinel; Tom Ferguson, Cheyenne, parliamentarian; and Henry Russell III, Laramie, delegates-at-large.

Gary Sherman, son of Billings agriculturist John W. Sherman, is being greeted by President Richard Nixon while representing Montana as a Key Club representative at Boys Nation this year in Washington, D.C. The youth was a delegate to Montana Boys State and a delegate to the National Key Club Convention in Florida. He entered Stanford University this fall.

Hundreds of persons attended the annual Greek Orthodox Church Picnic on the George Darsakis farm at Bridgeport, Neb.

Leo Hoehn, Bayard agriculturist, says the Greek family has an above average sugar beet crop this year. This farm consistently produces top beet yields.

Those at the recent picnic got a look at some of these beets as well as enjoying good old-fashioned Greek food, refreshments and dancing.

Dale Shull has been appointed agriculturist for the Henry, Lyman and Janise receiving stations near Lyman, Neb.

Dale was formerly agriculturist at Loveland, Windsor and Eaton factory areas in Colorado.

Peter and Jimmy Lapaseotes were out promoting GW sugar at the annual Oregon Trail parade at Gering, Neb. The brothers are sons of Scottbluff assistant manager and Mrs. George Lapaseotes. Their "big wheels" made a hit along the parade route—and it was all their own idea.
AROUND THE TERRITORY

Tim Lewis, 16, left, prepares his Suffolk yearling ewe for showing at the Wyoming State Fair in Douglas. Tim’s father, Jack, is landowner for grower Lowell Baker of Garland. Tim French, 16, son of grower and Mrs. Lyle French of Powell, is giving Tim Lewis a helping hand. The Powell youth has five acres of sugarbeets as a 4-H Club project.

Jeff and Greg Soule, sons of grower and Mrs. Clarence Soule of Pine Bluffs, Wyo., did all right with their heifers in show competition this year. Jeff, left, is holding his grand champion 4-H Short-horn “Duchess of Elmwood IV” at the Wyoming State Fair. The heifer took champion honors at the Laramie County Fair, and Jeff plans to take it to the livestock show in Phoenix. Greg’s “C-O-L Rose Kathy”, on the right, took second place at Douglas and was reserve champion at the Laramie County Fair.

Kim Hubbs, 16, son of beet grower and Mrs. Dale Hubbs of Lovell, Wyo., holds “Moses”, his calf which took grand champion male honors at the Big Horn County Fair. Others in the photo at the Wyoming State Fair were, L to R: Ron Kaufmann, Kim’s FFA advisor at Lovell; Dode Harrison, 19, son of grower and Mrs. Vern Harrison of Greybull, Wyo.; and Ken Judy of Greybull, Dode’s FFA advisor. Dode has 20 acres of FFA project beets.

The domestic sugarbeet industry lost one of its most prominent members and stalwart proponents when Harry Clark of Eaton, Colo., died Sept. 4 after a prolonged illness. He was 71.

Long active in grower affairs, Clark for many years was chairman of the American Sugarbeet Industry Policy Committee and in 1938 was president of The Mountain States Beet Growers Marketing Association.

The Eaton farmer also was prominent in the potato business and was chairman of the Colorado State ASCS Committee from 1953 to 1956.

His father delivered the first load of beets to come to the Eaton Factory on Oct. 15, 1902.
Terry Rides with Mom In Truck Hauling Beets

Mrs. Richard "Sandy" Einspahr and daughter, Terry, age 4, busily hauled sugar beets to the Holyoke, Colo., receiving station when weather permitted last fall.

It was the first year Sandy had Terry as an "assistant" in the truck—note the accompanying photo. Terry's brother, Mike, age 7, "helps" after school and on Saturdays.

Sandy's husband, Rich, put double springs on the truck side so she could lift the side back up after dumping the returned dirt.

Glen Zemanek, Holyoke agriculturist, says Rich sunk his first well in 1963 and planted his first sugar beets, 30 acres, in 1967. This year he had 140 acres of beets, plus corn, beans, alfalfa and irrigated feed.

Rich had a full-time hired man the last three years but he still calls Sandy on a walkie-talkie when he needs help moving pipe and setting water during irrigation.

HOLIDAY CHERRY COFFEE CAKE

½ C oleo 1 C GW sugar
Cream above items
2 C flour 2 t baking powder
1 egg—plus milk to make 1 C
Add to creamed mixture — beat — spread in 12x15 pan. Cover with:
1 can cherry pie filling
1 C GW sugar 1 C flour
½ C oleo
Mix until crumbly and put on top of cherries.
—Mrs. Henry Laber, Longmont, Colo.

MRS. RICHARD "SANDY" EINSPahr of Holyoke, Colo., and her daughter, Terry, 4, get ready to take a load of sugar beets to the receiving station.

CHOCOLATE SAUCE

½ C white Karo 1 C water
1 C GW sugar 3 squares unsweetened chocolate
1 t vanilla 1 C canned milk.

—Mrs. Rodney Crosby, Lovell, Wyo.

Mrs. Frank "Bonnie" Eckhardt Jr. of LaSalle, Colo., and son David, 5, romp with "Brandy," the family's 4-year-old Saint Bernard. Bonnie's other son Steve, 9, was at Gilcrest Elementary School when photo was taken and missed all the fun. Frank "Butch" Eckhardt has 41 acres of sugar beets this year.

These beet growers' wives got together during a dinner in Billings, Mont., after members of the Grower-GW Joint Research Committee completed tours of experimental projects in the area. They are, L to R: Mrs. Kish Otsuka, Sedgwick, Colo.; Mrs. Leo Bratsky, Bridger, Mont.; Mrs. Elmer Gustafson, Eaton, Colo.; Mrs. Roy Johnson, Eaton, Colo.; Mrs. Harlan Seaworth, Wellington, Colo.; and Mrs. Joe Alles, Billings, Mont.
Colorado Beet Grower's Wife
Worms Way into Garden Joy

By KATHY BAKER
"Through the Leaves" Staff Writer

When I turned the corner on the country dirt road and pulled in front of the Mitzel farm, I felt—without knowing the words, which were supplied later—that I was "nearer God's heart." I felt it even more strongly as I met Mrs. John "Martha" Mitzel, who is noted for her devoted respect for nature—principally, her garden.

Martha was featured on the cover and in an article in a recent issue of "Empire Magazine," a supplement of the "Denver Post."

Mr. and Mrs. John Mitzel live on a 240-acre farm in Prospect Valley, Colo., which they operate with their daughter and her husband, Jack Goble. In addition they rent 260 acres, and of this, 180 acres are sugarbeets.

Their home is small, cool, equipped with the latest appliances and conveniences, yet tinged with something old and sweet and good. It is respect—not just for their relatives, their workers, their neighbors—but a deeper respect for the natural order of things. "You know, Kathy, you can't just take from the soil and not put anything back," said Martha.

Using an organic method of fertilizing her garden, she not only preserves the soil, but nurtures it, with thousands of earthworms.

Martha was introduced to the method in 1955 when she read an article about a Florence, Colo., man who raised worms for fishermen and recognized the value they had for the soil. She contacted the man and returned with her first batch of earthworms—not ordinary earthworms, but a cross between the red wiggler and the orchard worm. The ordinary earthworm eats only the soil, but the red wiggler has to be fed. It feeds on waste and deposits its rich castings in the soil.

"I just feed the worms and they do all the work!" explained Martha as she guided me, her tow-head granddaughter, Christi, two kittens and two dogs through the garden. The ground felt like carpet—springy and moist but not wet. There were no paths or aisles, and the flowers weren't planted in rows. They were sporadic—iris, columbine, crown of gold, poppies—at least 40 varieties in one grand cluster that framed her house. Mrs. Mitzel rakes her garden only in the spring when she pulls back the mulch to plant new seeds and in the fall when she spreads a new layer of mulch over the garden. It wasn't a manicured garden, but "it's natural and it's beautiful," she said. I couldn't have agreed with her more.

Mrs. Mitzel feeds her worms with sugarbeets, waste such as burlap sacks, leaves, table scraps, coffee grounds, twine, manure, grass, weed cuttings, ground spoiled grain, spoiled hay and waste silage top which she piles in a heap on the outskirts of her garden. "The worms particularly like sugarbeets," she said. "After harvest my sister and I collect all the scattered beets that drop on the road for our gardens.

"This pile is where the worms feed. Each worm must eat twice its own weight daily to
survive. It eats its weight in food and then again in soil. Worm castings are always deposited on top of the earth, and in time the contents of the worm bed or pit will be pure worm castings, worth about $1 a pound."

The worms break clods, loosen and aerate the soil, she explained, as we poked in the dirt inspecting the "little wonders."

Mrs. Mitzel has attained such fertile soil in her garden that she rarely needs to use commercial fertilizers. As for needing insecticides, she said, "I didn't have one aphid this year," but added that occasionally she has to spray a small amount of Malathion on her roses and columbines for aphids and on her evergreens for red spider.

Wanderberries are Favorites

One of Martha's favorites is her wanderberries, sometimes called huckleberries. She said her seeds for the berry have been handed down in her family from Germany, but she has noticed it listed in several seed catalogues. The wanderberry looks like a blueberry, but is tarter and has tiny seeds in it like a tomato. Her old family recipe for "Wanderberry Pie" is worth growing the berries for, she laughed. The recipe follows this article. And as we inspected the thriving, berry-laden plant I asked how she kept the birds from devouring her crop. "I have cats!", and that was that.

She also grows red beets, tomatoes, turnips, lettuce, radishes, onions, asparagus, rhubarb, peppers, zucchini, carrots and cucumbers.

"Nothing is problem-free," Mrs. Mitzel said. "Of course we have the elements to contend with, but what others tell us proves we're doing something right." She was referring to the comments she receives from agriculturists that they've never seen such healthy soil nor such thriving plants. Mrs. Mitzel sells her worms for $5 a cubic foot where they are the thickest, but warns her customers that soil building isn't achieved overnight. "The first year, in 1956, I had about an inch of black topsoil—after I had put on about six inches of mulch," she said.

Her husband, a former president of The Mountain States Beet Growers Marketing Association, stopped on his way to his fields and said, "Martha's got the answer. Now if we could just apply it to a large operation." Mrs. Mitzel added that organic gardening is being endorsed more and more by ecologists and agriculturists. "Once you see it, you can't ignore it," she said. "Results are tremendous."

On my way to the car I stopped to read the poem on a stake Mrs. Mitzel has placed at the entrance of her yard:

The kiss of the sun for pardon,  
The song of the birds for mirth ,  
You are nearer God's heart in a garden  
Than anywhere else on earth.

With final "thank-you's", a jar of homemade corncob jelly in one hand and a bottle of pickles in the other, I headed back for the city.

WANDERBERRY PIE

1 pint wanderberries 3 T minute tapioca  
½ C GW sugar 1 T corn starch  
Juice of ½ lemon 2 T butter

Mix ingredients and fill pie shell. Put top crust over filling and sprinkle with cinnamon and sugar. Bake 35 to 40 minutes, for the first 10 minutes at 400 degrees, then reduce the heat to 375 degrees. Bake until brown.

CORNCOB JELLY

14 large corncobs 3 C GW sugar  
1 pkg. gelatin

Run water over cobs to take off the last of the chaff. In a large kettle cover the cobs with water and boil gently for 30 minutes. Strain 3 C of the corn liquor into a pan, add 1 pkg. of gelatin. Let this come to a hard boil, then add 3 C of sugar. When this comes to a fast boil, let it boil hard for 1 minute. Set aside and skim. Makes two pints. —Mrs. Claude Chambers, Wheatland, Wyo.
Colorado Agricultural College was created by the Territorial Legislature in 1870. When it opened in Fort Collins there were fewer than 30 students and faculty on the campus. Today there are almost 18,000 students, faculty and other personnel at the college, now Colorado State University. This aerial photo looks down on the main campus with the old stadium in the foreground. See story on pages 6-7. (Colorado State University photo)