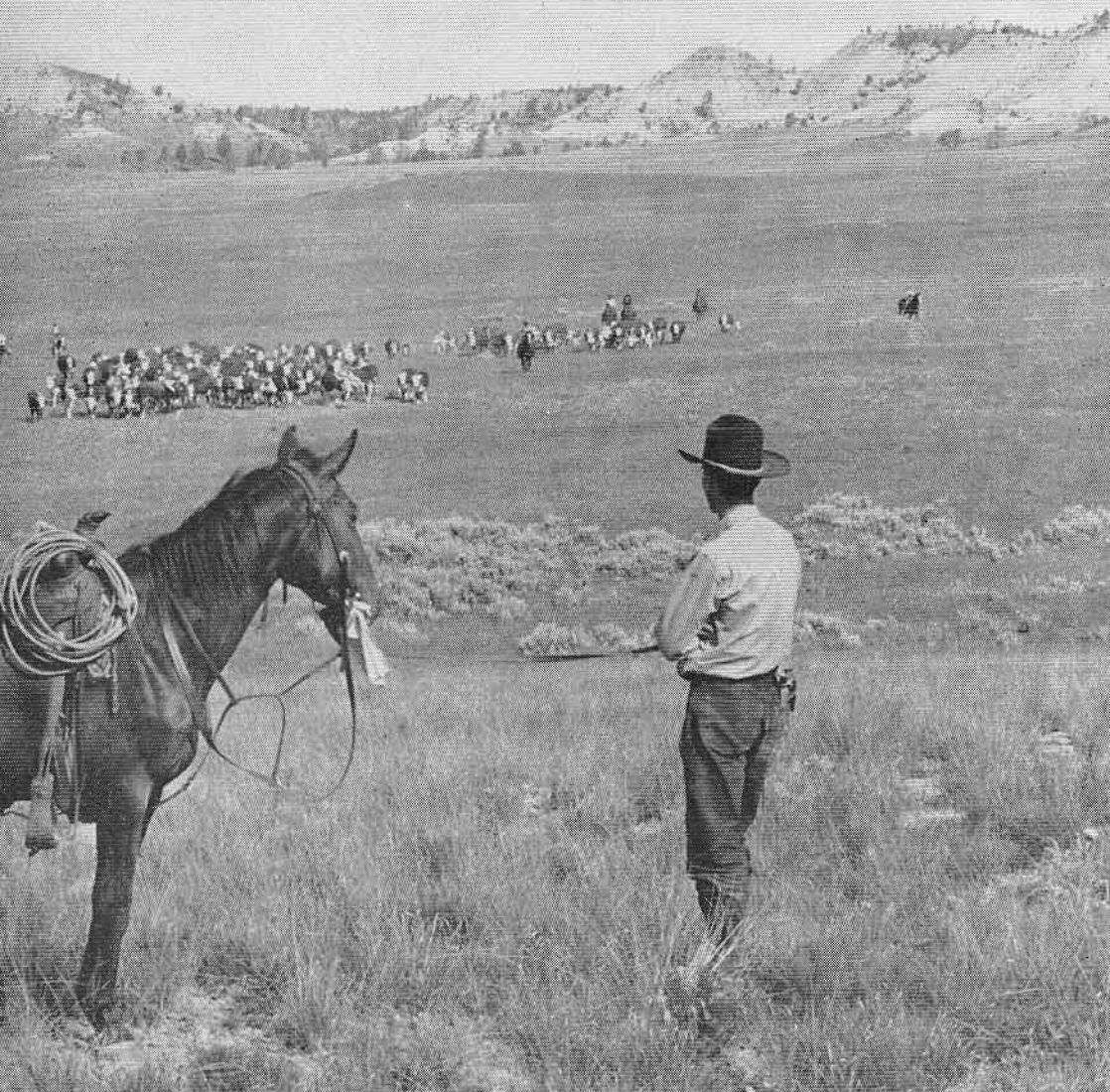


# *Grass Is the Wealth*



FEDERAL COOPERATIVE EXTENSION SERVICE

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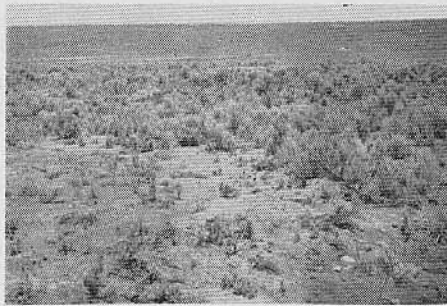
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# Grass Is the Wealth

"All flesh is grass" is the old biblical conception of livestock farming. A livestock operation is a system of farming whereby grass and other forage are changed into something that can be sold for cash. A hundred pounds of forage will produce just so many pounds of beef or mutton or wool. The true worth of a ranch can thus be measured by the number of



Poor range in eastern Oregon shows erosion, weeds, rocks, and spots of bare unshaded ground. Unpalatable plants replace most of the grass. Water is not retained but runs off instead of into the soil.

pounds of grass it produces rather than by acres or by number of livestock on it. A tract of land that will grow 200,000 pounds of grass each year is worth more than twice as much as a tract capable of turning off only 100,000 pounds. It is worse than useless to increase numbers of livestock on a ranch if the grass will not support more livestock.



Good range in the same area (Bradetich range southeast of Bend) has plenty of bunchgrass left, has little or no erosion, even on steep slopes. Water seeps into the soil, and the ground is shaded so seedlings can start.

## Facts About Range Grass

Following are a few rather simple facts about grass. An understanding of these facts is the first step toward range improvement. Without understanding, improvement is usually short-lived.

### Grass Fact No. 1

**Perennial grasses are more dependable than annuals.**

Oregon's range grasses are of two kinds: annuals and perennials. Cheatgrass (broncho grass) is a common

annual. There are many perennials, but bluebunch wheatgrass, Idaho fescue, and little bluegrass are most common. The annuals have one bad fault—their yield differs enormously from year to year. In one case, the measured yield in a year was 200 times the yield another year. A rancher can't keep 200 cows one year and one cow the next. Perennials differ in yield, too, but not nearly so much. A range with a full stand of perennials is, therefore, worth more than a range with only annuals. The rancher with a good perennial

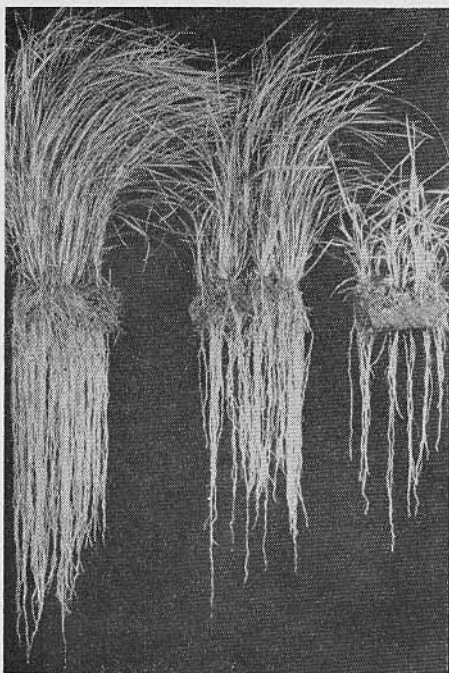
grass range has a more dependable business.

Another fault of annuals is that they are unstable, just as renters may be more unstable than owners. Annuals let bad tenants in, such as Halogeton, Mediterranean sage, and rabbitbrush.

### Grass Fact No. 2

#### **Root growth determines the top growth.**

The roots of some grasses will go down 10 feet if there is that much soil. but this enormous root system cannot live without leaves above ground. The best bunchgrass range in Oregon can be ruined in three years' time merely by keeping *all* of the top eaten off. One year's complete grazing can result in



Grass on left has normal root system, center clump has been used too much, and grass on right was eaten to the ground the previous year.

(Photo by J. E. Weaver, Nebraska).

the death of about half the roots. Two year's complete grazing can bring the plant close to starvation, and three years' grazing can cause the plant to die. Usually overgrazing isn't quite that extreme. More often the grass roots are weakened over a long period of years and the range depreciates so slowly the owner may not notice it. It may take many years before the downward trend of the range is reflected in decreased returns from livestock. As the good grasses go, their poorer relatives move in.

Grass roots can be compared to money in the bank. Whenever grass is eaten, the effect on the roots is the same as the effect a check has on a bank account. The root system with continuous withdrawal becomes much smaller—so does the bank balance. But whenever the grass is allowed to grow the roots enlarge, just as the bank balance grows when money is deposited. So the root system isn't at all stable. It goes up and down just as a bank balance does. The bank balance can be used and still kept healthy enough if deposits keep coming along. The grass can be used and still kept healthy if leaves are allowed to grow enough to renew the roots.

### Grass Fact No. 3

#### **Spring growth is critical.**

Grass starts in the spring from root reserves. If this early spring growth is eaten off, the roots are forced to do double duty, and surrender more of their strength to provide another top growth. If this too is eaten, then the effect upon the roots is bad. Some die, the plants are weakened, and it is easy for sage, rabbitbrush, and other invaders to come in.

Not all early grazing is harmful. It

is about the only practicable way to use cheatgrass. On such ranges if the stock is taken off while some soil moisture is still left, the bunchgrass remnants often recover, replace their root reserves, and make seed.

It is best to use a straight cheat range early every year.

### Grass Fact No. 4

#### **Cutting grass to the ground kills it.**

Most trees die if cut off at the ground. Dryland grasses resemble trees somewhat. The grasses can live only if they have leaves. Most of the food in the plant is in the leaves shortly before seed starts to form. If eaten to the ground at that time, there will be re-growth if there is plenty of moisture, but in eastern Oregon rain after June may be scarce as cows' incisors. So complete use—mowing clear to the ground—can close the career of a promising member of the grass family.

Grass draws on the root reserves until the plant nears maturity and then the leaves rapidly pay back what they have borrowed. If every plant were allowed to make seed every year, the roots would be fat and happy. That isn't always possible, so the next alternative is to allow some grass to seed every year. If 30 to 50% of the heads go to seed each year, such a range will in time outyield any range used more heavily. Fall growth, if it comes early enough, is also used by the plant to store food in the roots.

### Grass Fact No. 5

#### **The mature dry growth is low in protein.**

What about the dry grass after seed has formed? It doesn't hurt the grass to use it when dry, but unfortunately it is too low in protein to maintain

weight on livestock. The dry grass, if *abundant enough*, can be used without loss of animal weight if:

- ▶ Animals can get protein from shrubs or summer growing broad-leaf weeds, or
- ▶ The livestock are given protein concentrates, or
- ▶ Young green leaves are sprouting.

Grass starts in the spring with a high protein content, about double that in most alfalfa hay, but the percentage of protein drops fast as soon as seed heads start to form. At the beginning of seed head formation, grass has more *protein per acre* than at any other time. Cattle have to have range feed averaging over five percent protein to maintain weight. Young grass averages 20% protein or better. Dry grass runs as low as two percent.

The scarcer the feed, the more serious is a low protein diet. Stock can't eat enough to catch up on the supply or they are forced to eat prickly shrubs, bitter or otherwise unpalatable feed, or even poisonous plants.

### Grass Fact No. 6

#### **About half the mature growth is needed to control erosion, to get water into the ground, and to allow for seed setting and growth of young seedlings.**

Erosion on range or farm land can be fairly well controlled by having plenty of litter on the surface. On most ranges this can be accomplished by letting about half the growth go unused so it can fall down on the ground. The litter also lets water into the soil, conserves surface moisture, and allows young plants to get started. Eastern Oregon wheat farmers know that stubble left on the surface will prevent most of the erosion that otherwise occurs on summer-fallow. Growth

left on the range does the same thing.

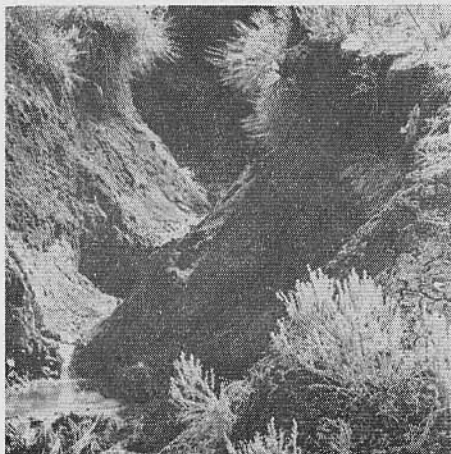
If muddy water runs from a range, the soil is eroding. If the perennial grasses are killed, they can be brought back, but if the soil leaves, that range is effectively killed.

### Grass Fact No. 7

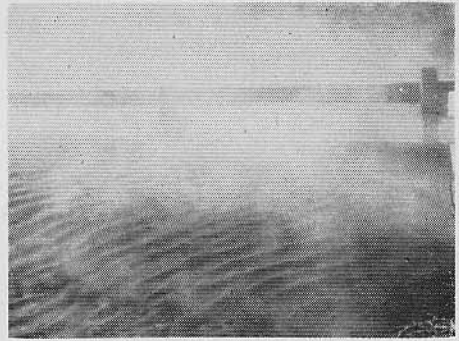
**It takes about 800 pounds of water to produce a pound of grass.**

Range plants take about 800 pounds of water to make a pound of dry matter. Pasturing doesn't change that. If, for example, 90% of a range is occupied by perennial shrubs that stock do not use much, then such a range can turn off only one-tenth as much grass as it is capable of producing. Nonuse will allow this 10% of grass to get stronger, and eventually it may fill in as the brush dies, but the brush has a habit of living for about 75 years.

Stockmen are patient, but they can't wait that long. If the range has only a scattering stand of brush, and is mainly in grass, then by strengthening the grass, the brush may be weakened and killed. But this is still a long pro-

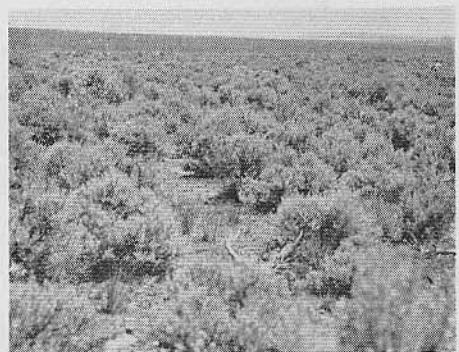


**Water furnishes cheap transportation for soil as it leaves the ranch when a range is incorrectly managed. (Photo taken in Lake County).**



**Wind also can carry soil away. (Photo taken near Boardman by Soil Conservation Service).**

cess. No system of grazing will change the amount of water that falls on a range, and no magical range plant will yield well without rain.



**A brushy range is likely to continue to be a brushy range for a long time, even with good management. It doesn't help much to try to "manage" almost 100% stands of brush. The brush on this range is taking 80% of the available water.**

### Grass Fact No. 8

**Range grass growth is seasonal; livestock eat every day.**

The simple fact that grass growth is seasonal and livestock eat every day is reason for range trouble. It is easy to keep an irrigated pasture in fine shape because the grass grows there every day of the season. In biblical

times, as now, the herds trailed the fresh grass from low to high elevations to keep on rich, new growth. But suppose a ranch doesn't have any high elevation range? What can the owner do?

The problem is how to get enough early spring feed and to keep the stock

gaining after July 1. The better the range, the less the problem, so merely by keeping the range production high the problem is partly solved. How can a rancher get around the lack of balance between spring and summer feed? A few suggestions are in the following section.

## *Evening Out the Pasture Season*

A. Use rye or winter wheat for early spring, thus letting the main range get well started.

B. Seed desert wheatgrass\* on a field or two, allowing one acre for each animal unit of livestock. Use this for early feed.

C. Get early feed from an irrigated meadow. If still more feed is needed, fertilize.

D. Save the main range until the seed stalks start to shoot.

E. Use a protein supplement for summer use while the stock are on mature grass.

F. Use aftermath on hay meadows or irrigated pastures for fall use.

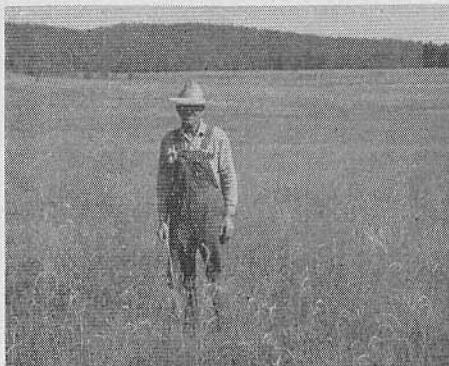
G. Relieve grazing load by developing and fertilizing irrigated land. One acre may thus take the place of 100 acres of dry range.



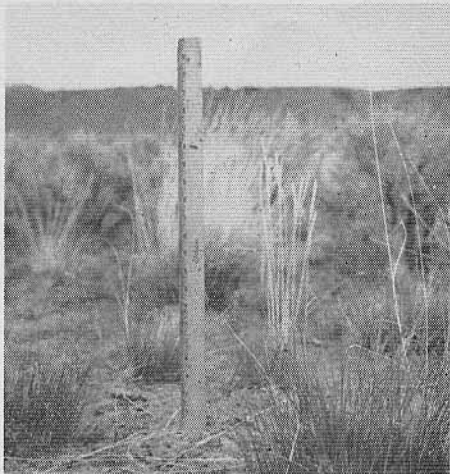
One acre of desert wheatgrass\* on a good site can be used to relieve spring grazing on 30 acres of natural range. About five percent of the range of this Umatilla County ranch is in desert wheatgrass\*.



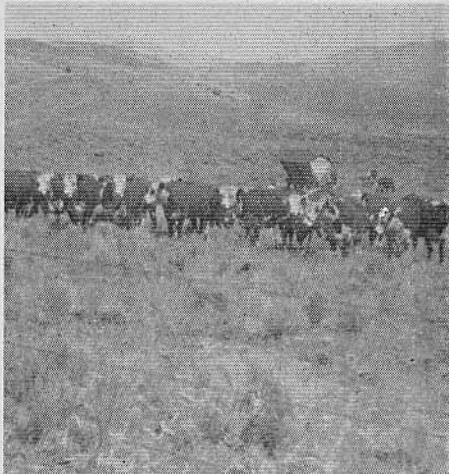
R. F. Sorenson, North Powder, Union County, is shown in his fertilized meadow. In the picture below he is shown on his unfertilized meadow. Irrigated land can be used to improve the dry land, and the water allows the use of fertilizer.



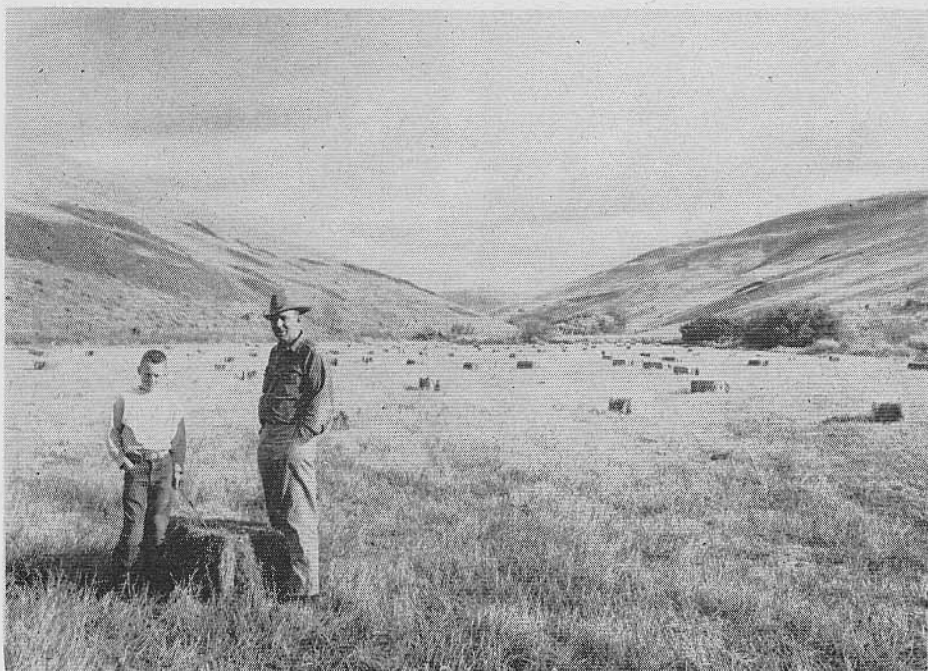
\* Botanists have changed the name of crested wheatgrass to desert wheatgrass and now call the "Fairway" strain crested wheatgrass.



Bluebunch wheatgrass and Idaho fescue are shown when about in the right condition for the start of spring grazing. A thrifty spring growth used wisely will keep a range good for pasture indefinitely.



Protein supplement is fed with a salt mix during the summer on the Fopiano Brothers' ranch near Waterman, Wheeler County. Dry grass has plenty of energy, but little protein. With added protein cattle can make use of dry feed.



The aftermath on irrigated meadows or pastures can be used for fall grazing. Here Bill Weatherford, Morrow County, and son are shown in July, 1957, in a field of Nomad baled hay. The field yielded three tons of hay per acre in the one cutting.



# How Can Badly Damaged Range Be Improved?

## **Remove the brush, then improve.**

If the range is almost completely covered by nonforage plants, no system of grazing is going to help very much or very fast. A wheat farmer would think a man sort of crazy who told him the morning-glory patch would disappear if he did his harvesting right. Yet many ranchers have tried to make range weeds disappear by various methods of grass harvesting.

Complete nonuse for 19 years at the Squaw Butte Experiment Station left a sagebrush range still a sagebrush range. Improvement is too slow. In such cases, the best procedure is to get rid of the sage first, then improve. Such a range should be seeded to perennial grasses the same year the brush is removed or the good effect is likely to be short-lived. If such a range is originally 90% unusable brush, removal and reseeding often will result in 10 times more beef to the acre. This frequently is far cheaper than buying more land. Suitable grasses and proper chemicals or machinery are available. If a man with a brush range wants to expand, wants to carry more stock—what is he waiting for?

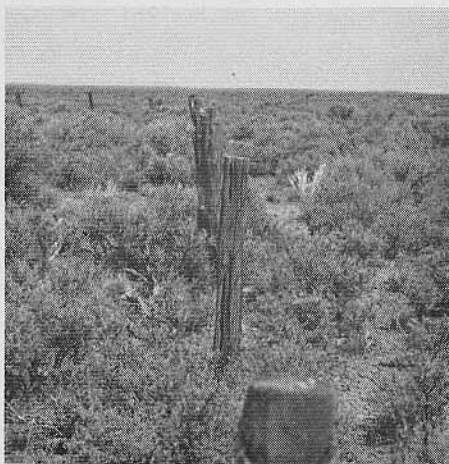
## **A cheatgrass range is even harder to improve than a brush range.**

If the injured range has gone completely to cheatgrass, the job of improving is even harder. No system of management is likely to make the cheatgrass yield more than it is yielding right now. The best way to use cheatgrass is to use it heavily in the

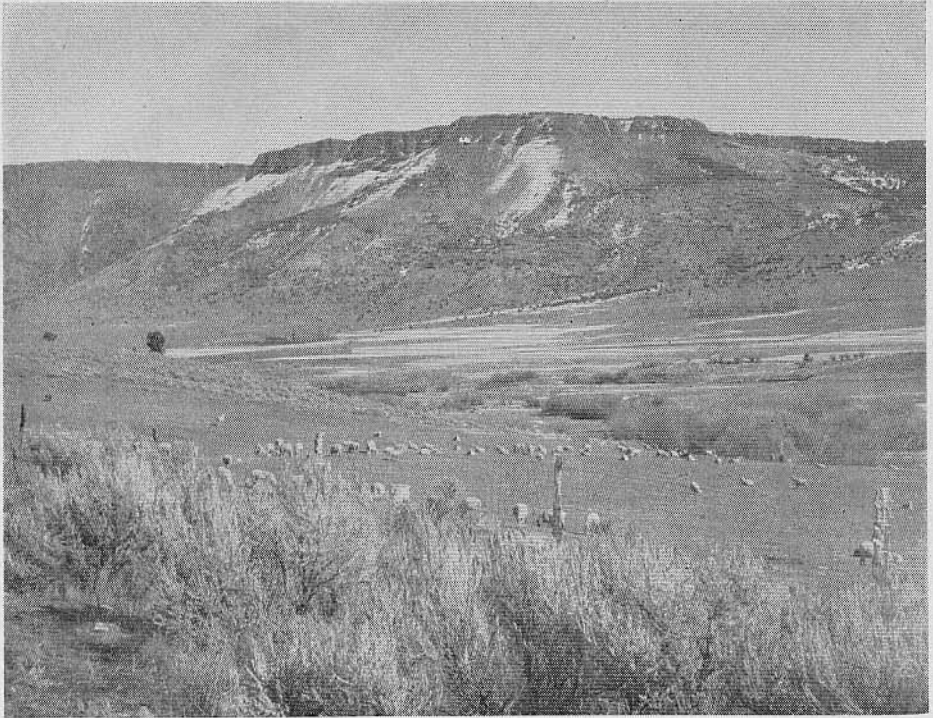
spring. Such use of the range probably brought the cheat there in the first place. If such a range can be worked with machinery and a seedbed prepared, perennial grasses can be seeded and the range restored. If it is too rocky to work, perhaps it can be spot worked and seeded. If it is possible to use it so perennials make seed each year, they may increase in time and gain strength until they take over. This will take a long time. Don't depend much on it.

## **Don't place too much dependence on a grazing system.**

There are no substitutes for proper stocking and proper season of use. Most of the systems are theoretically



Area on the left, at the Squaw Butte Experiment Station, has been fenced and untouched by livestock for 19 years. Area on the right has been grazed most of that time. Even total non-use for 19 years hasn't helped much.



**One acre of developed, fertilized, irrigated land can take the place of 100 acres of dry range. Here an irrigated sheep pasture near Abert Rim, Lake County, is shown**

good, but often are unsuccessful in practice because of failure to recognize this point. The primary systems are:

- ▶ Continuous grazing
- ▶ Deferred grazing
- ▶ Rotation grazing
- ▶ Deferred-rotation grazing

*Continuous grazing* means putting the proper number of animals on a range at the time the forage is ready to graze, and leaving them there as long as the season justifies.

*Deferred grazing* means leaving a range unit ungrazed until after maturity so the desirable forage may build vigor, set seed, and improve the stand.

*Rotation grazing* is the practice of subdividing range or pasture units and grazing repeatedly over the area in

short periods until the year's usable production is removed. This system is most common in irrigated pastures.

The ideas embodied in these latter two systems have been combined into a management practice referred to as *deferred-rotation* grazing. This practice involves the subdivision of large range units and of rotation grazing among these units so all are used, but with one unit deferred each year until after seed of the important forages is mature. In some areas deferred-rotation grazing has proved successful, while in other situations it has failed to compare favorably with continuous grazing where the latter was used wisely. Deferred rotation did not work well at Squaw Butte. In some instances, systems of management that

were intended to follow the theoretical principles of deferred-rotation grazing have resulted in serious range damage.

In unusually dry years, the deferred rotation plan may injure the grass so severely in one of the pastures that the year of deferrment cannot repair the damage.

A far better system is to provide supplemental feed in early spring, leaving all the native range until no damage can be done by grazing. As mentioned, this supplemental feed may be:

- ▶ Winter rye or winter wheat
- ▶ Desert wheatgrass (formerly "crested" wheatgrass)
- ▶ Irrigated pasture

Cheatgrass ranges do not lend themselves to deferred and rotation grazing. Many ranches have low elevations for spring use, high elevations for summer use. Deferred-rotation sys-

tems should not be attempted across such widely different areas with forage varying in season of use. On many ranches season of use is determined by water supply, poisonous plants, or kind of feed.

The success of the deferred-rotation system depends upon having all ranges highly similar in season of growth and kind of feed. This feed must be a kind that can be used all season.

#### **Use run-off water by spreading and providing partial irrigation.**

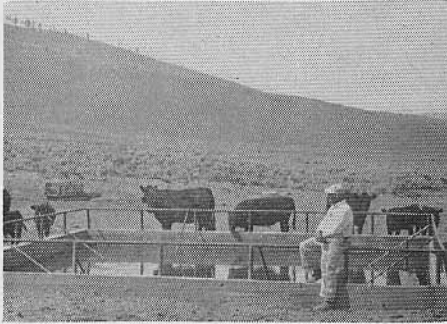
If any water runs from a canyon in the spring, perhaps it can be spread out over enough acres to make it pay with or without storing in ponds. Such water spreading, even if not dependable, allows for seeding some higher yielding grasses and can easily step up production so that one such acre can turn off as much as 30 dry acres.



Two riders watch while a tractor-drawn disk chews up the sagebrush on the Elder Brothers' range, north of Lakeview. Fire, chemicals, or mechanical equipment are used in the three main methods of brush removal. These are described in another Oregon State College bulletin.

**Additional water holes will help.  
Hauling of water is possible.**

Nearly all ranges can have additional water holes. It is impossible to get too many. The more water, the less walking the stock do and the more weight they put on. If water holes are too far apart, the livestock tend to camp at the water, reduce the forage



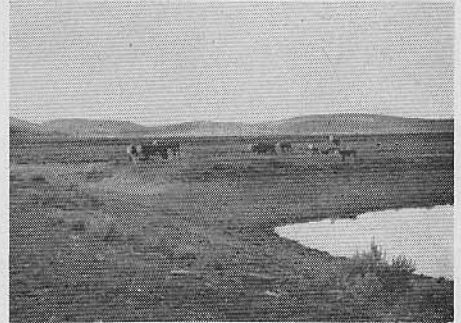
**A good watering place is shown on the Bradetich range in Deschutes County. Less expansive developments are shown in other pictures.**



**Hauling water is one way to spread cattle and get them to use range otherwise not used much. This picture shows water being hauled on the Bradetich Brothers' range, east of Bend.**

there to zero, and thus create an ever-widening circle of desert around the water. If the practice is kept up long enough, these circles meet and grass becomes scarce on that range.

Hauling water is not so impossible as it sounds. Sheepmen have done it for years, and it may be cheaper to haul water for cattle than let them walk off their weight in search of it. Maybe it's cheaper for the owner to haul water than for him to let the cattle haul it long distances as they walk from feed to water and back.



**A natural depression has been dammed to retain water. It is cheap and effective.**

It is often cheaper to haul water than to rent other range. Cost of hauling per head per day should be balanced against the value of the beef added per head per day. It may pay or may not, depending on price of beef, class of cattle, cost of hauling, and cost of alternatives.

**Fencing into more pastures is often the best single range management step.**

A range handicap is the natural tendency for stock to eat grass on the south slopes first, leaving north slopes untouched. On many ranges these south slopes are now eroded and almost ruined. Fence lines on the ridges

might help in some cases. Fences are needed on many ranges to allow the range to be used in accordance with its needs.

Many of the best range operators in Oregon have 20 or more pastures. These smaller pastures are a great aid in getting bigger calf crops; preventing aimless travel by the stock; allowing light use or nonuse; compelling the stock to use all of the range; cutting down riding; allowing the owner to keep a closer check; allowing bigger calf crops with fewer bulls; better care of fresh cows and young calves. In addition, they give a chance for owner or buyers to see the stock without staging a roundup. Smaller pastures also allow proper use of the range. A hundred acre pasture may carry only two or three cows safely, but another hundred acres may easily carry 20 cows. With smaller pastures each part of the range can be stocked correctly.

### **Grazing alfalfas offer promise.**

In many places where seeding of grass is possible, it is also possible to seed one of the new pasture-type alfalfas. Such a seeded range is likely to be more productive than if seeded only to grass, and the protein in the alfalfa will make the range better for summer use. As this is written (1957) many experimental seedings of these alfalfas are underway, and their limitations should be known soon. There are seedings in each Eastern Oregon County and ranchers can watch performance under conditions similar to their own.

### **Salt can be used to help distribute cattle.**

Distribution of salt is not so important as fencing or water development, but it can be an aid in scattering the cattle, particularly if watering places are plentiful.



It is impossible to get too many water holes. The more time the livestock spend walking to and from water, the less weight adds up to sell in the fall.

# Summary

1. True worth of a ranch depends upon the amount of usable forage it produces.
2. Grass facts:
  - a. Perennials are dependable. Annuals are fickle.
  - b. Top growth depends upon the root system. Roots are like money in the bank, to be conserved or squandered.
  - c. Spring growth comes entirely from the roots and should not be used too soon.
  - d. Keeping bunchgrasses eaten to the ground will kill them quickly.
  - e. Stock can't maintain their weight on mature, dry grass.
  - f. Half the year's growth should be left to control erosion, build stronger plants, and shade the soil so seedlings can start.
  - g. It takes 800 pounds of moisture to make one pound of dry matter. There is no miracle grass for dry land. If other plants occupy the land and use the moisture, the range yield will be low.
  - h. The range problem—stock eat every day, grass grows mostly in spring. This is a fundamental range defect.
3. Evening out the pasture season:
  - a. Use rye or winter wheat in the spring.
  - b. Seed 5% of the range to desert (formerly "crested") wheatgrass.
  - c. Get early feed from an irrigated, fertilized meadow.
  - d. Save the main range until the seed stalks start.



Nomad alfalfa was pictured in August, 1953, at the Squaw Butte Experiment Station.

- e. Use a protein supplement after grass dies.
  - f. Use irrigated land for fall pasture.
  - g. Develop and fertilize irrigated land.
4. Range improvement possibilities:
    - a. Get rid of nonusable plants.
    - b. Most range improvement projects don't work well on cheatgrass.
    - c. Don't put too much dependence on a system of management. Try to balance feed consumption with

- production, keep the plants healthy, and don't worry too much about a rigid system.
- d. Where water runs from a canyon in the spring, there may be a chance to divert it and partially irrigate dry range, thereby changing it to meadow conditions.
  - e. It is impossible to get too many water holes. Hauling water may help if water holes can't be developed.
  - f. Fencing is one of the best of all improvement measures. It can help the cattle, the range, and the owner.
  - g. Grazing-type alfalfas should be tried as fast as knowledge accumulates. Trials are going on in every eastern Oregon county.