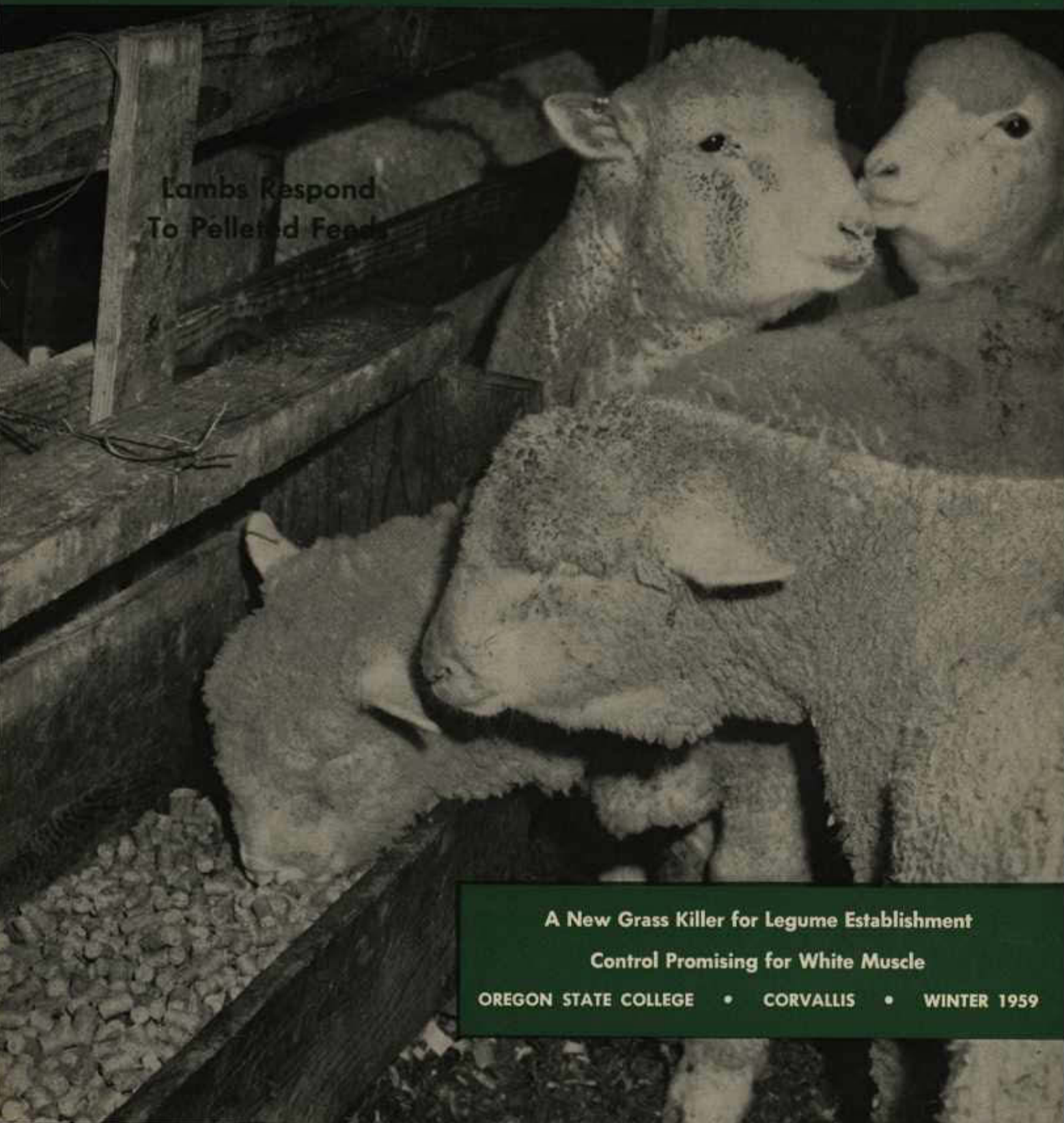
# Oregon's Agricultural PROGRESS



Lambs Respond
To Pelleted Feeds

A New Grass Killer for Legume Establishment

Control Promising for White Muscle

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Oregon's Agricultural
# PROGRESS

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**COVER: Research workers at OSC and elsewhere have shown that pellet-fed lambs gain more than lambs fed the same ration in a loose form. Story, page 4.**

*Photo: Bill Reasons*

OREGON'S CENTENNIAL year should be a fairly good one for most farmers in the state. Incomewise, it will be better than most of the past 100, but probably not as good as a few.

Compared to 1958, returns from grain, dairy, and livestock operations probably will be much the same. Fruit and vegetable growers may come out a little better but poultrymen and hog raisers are likely to make less money this year.

Government payments under the wool, sugar, soil bank, and conservation practices programs will add moderately to returns received through the market place. Also, many farm families will supplement their farm income from off-farm sources.

### More jobs in sight

Off-farm jobs may be somewhat easier to find in 1959 than in the past two years. The number of people working off-farm in the state and nation probably will be at record levels during the year, although the number looking for work may be larger than two or three years ago.

Meanwhile, the number of people working on farms probably will continue to decline. This is a trend that is likely to continue for several years. If output per man hour continues to rise as in the past decade, the nation's 1975 needs for farm products can be met with a third fewer man-hours of farm labor. We are abundantly meeting today's increased needs with one-fourth fewer workers on farms than we had ten short years ago. At that time each farm worker was supplying food and fiber for himself and 13 other persons. Now he provides for himself and 23 others.

Thus, the brains and brawn of nearly 3 million farmers and farm hands have been released from U. S. farms since the war; the machines and technical know-how to increase farm production and release still more manpower are at hand.

### Economic forces at work

Oregon's farm income prospects for 1959 assume reasonably favorable weather and reflect the net effects expected from the many economic forces affecting farm prices and costs.

As in other recent years, farm commodity prices and profits in the months ahead will depend heavily on what hap-

Expect larger wheat carryover . . . skidding hog prices after July . . . '59 wool prices no lower than last spring's . . .

# Farm Outlook

**By Agricultural Economist M. D. Thomas**

pens to supplies and government programs. Summaries of these prospects follow.

**Wheat:** Even if the nation's 1959 crop falls short of last year's record-breaker, wheat programs will be a big worry to Congressmen and administrators. At best there will be enough carryover from past years' crops to keep supplies at burdensome levels. It has been convincingly demonstrated that present allotments are capable of producing much more wheat than can be disposed of for food in this country or exported without serious conflict with the interests of friendly nations seeking markets for their food grains.

Exports of Northwest wheat have been lagging recently. The total for the first six months of the current marketing season was only 37½ million bushels, just slightly more than half as much as a year earlier. Odds are the carryover here next July will be larger than last July but not as large as two years ago. At the same time, the national carryover is likely to be at record levels.

Meanwhile, Congress will struggle with revisions in present legislation. Bushel allotments may be tried. Then, too, the multiple-price, or domestic parity, approach has new-found appeal to some budget-minded tax-conscious officials. This approach shifts much of the cost away from government budgets to the market place. It seeks to maximize grower returns by protecting the primary domestic food outlet from the price-depressing effects of abundant supplies while permitting the expansion of secondary feed and export markets. Versions of the multiple-pricing principle have been approved for rice and are currently in use in marketing agreements and orders for milk, fruits, and nuts.

**Feed Grains:** The new corn program is likely to raise corn prices a little next fall. Effects on barley and oats support levels are still uncertain, but changes from last year are not likely to be large.

In any event, feed grain supplies will continue super-abundant, unless very bad weather takes over this spring and summer. The nation's carryover at the end of the current feeding season will be nearly three times the amount five years ago. Here in Oregon and the Northwest it may be six or seven times as great.

The nation's record-breaking 1958 crop was fully 10% larger than in 1957 and half again as large as crops produced 20 years ago. But it was harvested from an acreage slightly smaller than used for feed grains at that time.

**Forage:** Oregon hay prices have recovered some from last year's very low levels; but hay won't be high-priced this year unless the winter is more severe and longer than usual. Use, including shipments out of state, up to the first of January was practically the same as a year earlier. Supplies remaining at that time were only 2% smaller than last January and still fully a fourth above the 1950-54 average.

More snow is needed to assure good range feed in the high country this summer. Fertilizer will boost forage yields on many meadows. It is good insurance most years and can be a real money saver in years when feed is short.

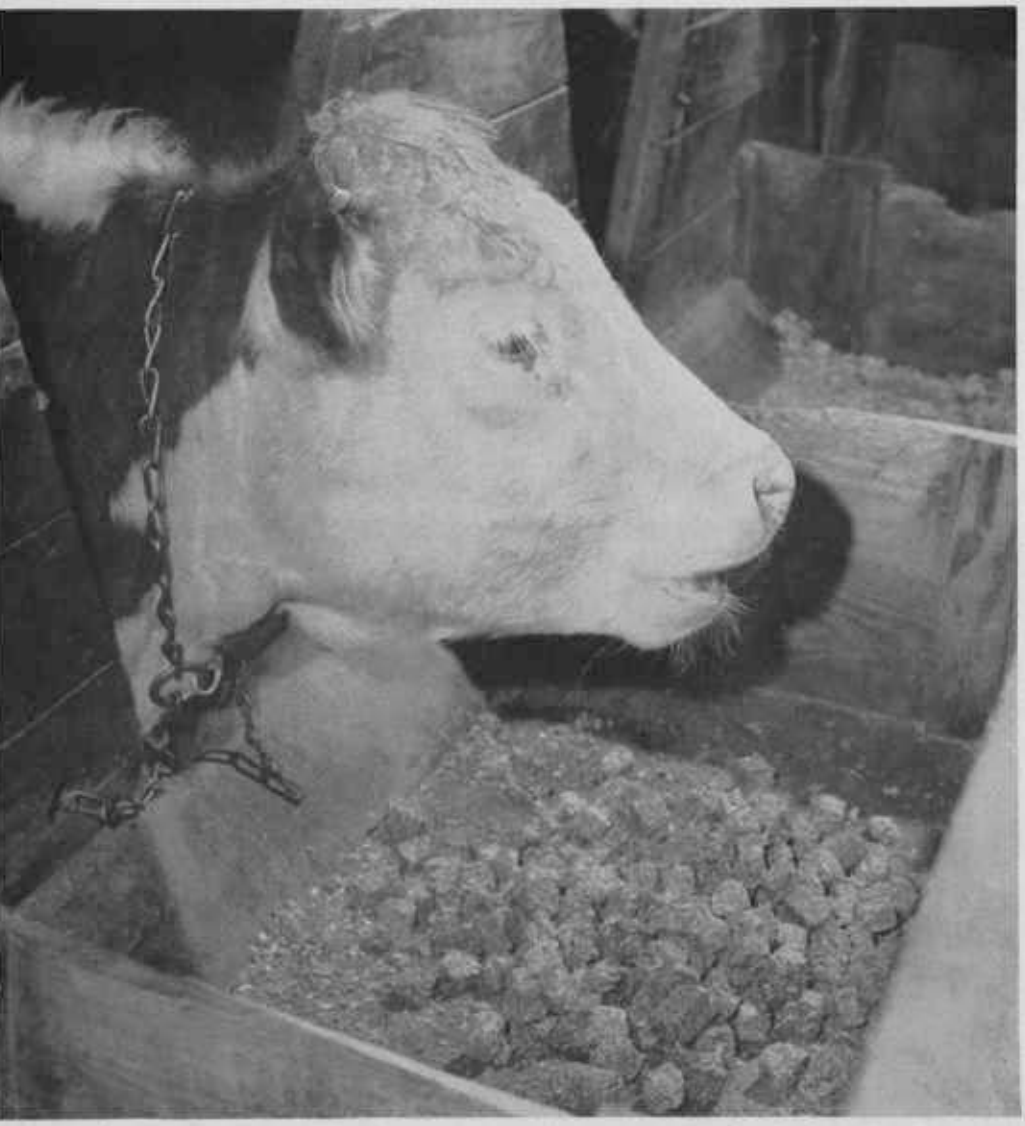
(*Continued, page 16*)

**DESPITE poorer returns to feeders this year, bidding for the limited offerings of calves and yearlings next fall is likely to be strong enough to keep feeder prices near the past year's levels. Later, as heifers now being saved start calving, prices of calves, yearlings, and cows may begin working down.**

# *Pellets and Wafers:*
# How Will They Fit Your Operation?

Research results at OSC and elsewhere indicate pelleting will increase gains in some cases, not in others. This story sums up what research knows about pelleting benefits.

**BEEF CATTLE appear to gain better on coarsely-ground than on finely-ground pellets, tests show.**



PROBABLY NOTHING has created more interest recently in livestock feeding than roughage pelleting. Advances in machine design mean roughages can be compressed into a variety of sizes and shapes with varying degrees of fineness of ground material.

Pellets can range in diameter from 3/32 of an inch to 1 inch, and a recently developed "foragizer" machine can turn out wafers measuring 4 inches in diameter. While conventional pelleting processes require grinding with a hammer mill and steam treatment, the "foragizer" compresses coarsely chopped hays by pressure without steam.

Roughage may be pelleted alone or in combination with varying mixtures of grains, concentrates, and minerals. This is particularly interesting to feeders since it makes possible the feeding of roughage-concentrates in one convenient form, and provides a means of supplementing low-quality roughages that animals would not eat alone.

But do pellets pay their way? Do pellets always provide the advantages claimed? What are the disadvantages of pellets? When is it best to use pellets and when best not to use them? And what does the future hold for pelleted roughages?

Research hasn't the answer to all these questions, but a survey of research findings at OSC and experiment stations across the country provides some clues, according to animal husbandman J. E. Oldfield.

Dairymen have been concerned about

**WAFER-REFUSAL has been less than 1%, compared to 29% for the same hay fed loose, according to current trials at the Astor branch station. In earlier trials, Guernsey replacement heifers gained as much on a pelleted hay-barley-molasses ration as those fed loose hay, pelleted barley, molasses.**

the effect on fat content of milk of feeding finely-ground roughages in pellets. Milk fat is mostly formed from organic acids absorbed from the rumen. Research workers elsewhere have shown that finely-ground materials—which pass rapidly through the rumen—result in lowered milk fat production.

### Dairy cattle maintain milk volume

OSC dairymen I. R. Jones and B. F. Magill, and statistician R. G. Petersen compared alfalfa hay when fed baled, wafered (3-inch diameter), and pelleted (½-inch diameter) to lactating cows. The researchers concluded that the coarser material (baled or wafered) maintained milk fat levels above those supported by the more finely-ground roughage pellets. But they also reported no important differences among the three forms of hay in the amount of feed consumed nor in the amount of actual or 4% fat-corrected milk produced. Also, there was no difference in body weight changes.

Guernsey replacement heifers at the Astor branch station gained as much (1½ pounds per day) on a pelleted hay-barley-molasses ration as those fed long hay and pelleted chopped barley and molasses, according to superintendent H. B. Howell.

Complete pellet makeup was 72½% alfalfa hay, 25% barley, and 2½% molasses. Howell noted, however, that heifers fed pellets seemed to desire nonpelleted roughage—even chewed the wood from their pens. Jones also has noted board chewing by heifers now being fed bleached, 2-year-old alfalfa, grass hay pellets, and 3 pounds of concentrate mix daily. Other heifers are receiving the same ration except that the same kind of hay is fed loose. No board chewing by those fed long hay has been noted.

In current trials, Howell reports that wastage due to refusal has been about 1% for wafers, about 29% for the same hay fed loose. In this experiment, lactating cows in both groups are being fed silage free choice in a loafing barn. Comparison is only between wafers (4-inch diameter) and long hay.

### Lambs respond to pellet feeding

Results of 15 separate experiments with 810 lambs at several agricultural experiment stations indicate that pellet-fed lambs average 0.40 pounds gain per day compared to 0.33 pounds per day when fed loose rations.

Pelleting increased feed efficiency, too, since 9.89 pounds of loose ration were required per pound of gain, compared to 8.21 pounds of pelleted ration.

In New Mexico, research workers first showed that while light lambs performed about the same on pellets containing either 50%, 60%, or 70% alfalfa hay, heavy lambs (about 87 pounds going on feed) gained much better on 70% alfalfa pellets than on pellets containing lower roughage levels. This suggests that pellet formulations may have to be altered for best results to suit different stages of growth or fattening.

Purdue workers found that lambs that were creep-fed pellets containing

**THIRTY pounds of feed have different space requirements, depending on how they are processed. From left, pellets, 3-inch wafers, baled, and loose hay. Pelleting adds a processing cost feeders must pay.**

98% dehydrated alfalfa meal grew as rapidly and efficiently as others fed pellets containing less alfalfa meal but more corn.

OSC animal husbandmen D. C. Church and C. W. Fox report gains of from 0.42 to 0.51 pounds per lamb daily on grass-alfalfa hay pellets supplemented with various additives.

Thus, satisfactory gains are possible over a wide range of grain-to-roughage pelleted combinations. However, size of gains may be influenced by a number of things, including quality of ingredients, physical nature of pellets, and use of various supplements.

### Beef cattle response varies

Oldfield found less consistent advantage for pellets reported among experiments with beef cattle. For example:

Washington research workers report no difference in rate of gain for cattle fed a grass-alfalfa-grain ration in pellets or in loose form. Wisconsin scientists reported similar negative findings.

But animal husbandmen in Wyoming and Illinois found important increases in beef cattle gains because of pellet feeding.

In the Illinois tests, according to Oldfield, it was evident that pellets made from coarsely-ground material were superior to those made from the same ingredients finely ground. Generally, greater advantage was obtained from pelleting low-quality roughage in combination with grain or supplements than from pelleting high-quality roughage that animals would eat well in the loose form.

Field trials by R. O. Petersen, Klamath County Extension Agent, indicated that yearling steers fed pellets containing 70% ground roughage gained 2.26 pounds daily, compared to 1.94 pounds by those fed chopped hay. Petersen also observed that pellet-fed animals ate considerable amounts of straw used as their bedding. It appears that either coarsely-ground roughage should be used in pellets or supplied in addition for best results.

### Advantages and disadvantages

From those described and from other experiments and reports, Oldfield says the following advantages have been claimed for pellets:

¶ Pelleting reduces feed bulk, requiring less space for hauling, storage, and handling, and enables the animal to eat more.

¶ Pelleting reduces waste, especially of wind-blown meals and dusty ingredients, and lowers loss of leaves caused by shattering and by trampling of stemmy roughages.

¶ Pelleting can extend usefulness of low-quality feeds by combining them with more palatable and nutritious supplements. Animals cannot sort out ration ingredients, and all receive the complete diet intended for them.

¶ Pelleting puts roughages in a convenient form for bulk handling by conveyors and other mechanical methods.

But Oldfield notes these disadvantages:

¶ Pelleting adds a processing charge the livestock feeder must pay. If coarsely-chopped forages are used, output of conventional-type pellet mills is reduced, and more power is required; both increase pelleting costs.

¶ Present pellet mills are fixed installations. This means homegrown feeds must be hauled two ways for processing.

¶ Pelleted feeds lose their distinguishing characteristics. For example, a producer accustomed to evaluating long hay cannot use the same standards to determine quality of hay pellets.

¶ Pellets require more protection in storage than baled or loose hay.

From the research information described, Oldfield says it is difficult to say exactly when it pays to feed pellets. The decision must be made for each situation, based on local costs and feeding conditions.

Mechanized feeding probably will permit feeders of the future to take greater advantage of easier-handling pellets. Development of commercial wafering machines that will pellet hay in the windrow appears certain, but their effect in terms of efficiency has yet to be evaluated. Also, the possibility of using the pelleting or wafering process to put low-quality feeds and "waste" products into a form economical to feed has yet to be developed.

**BOARD CHEWING among pellet-fed heifers has been noted both at Astoria and at Corvallis. No board chewing apparent among long hay-fed cows.**

**MOST COWS rub 4-inch wafer on manger to soften and break before eating. Wafers and long hay maintained milk fat levels and milk volume in OSC tests.**

# Better Weed Control With a New Chemical

Here's a weed killer that controls several annual, perennial grasses.

**WEEDY birdsfoot trefoil plot is examined by agronomist Bill Furtick. Weed-free area in back was spring-sprayed with Eptam.**

A PROMISING NEW CHEMICAL has joined Oregon farmers' arsenal of weed killers.

It's Eptam.

And it's a selective killer of two of Oregon's bad perennial weeds—yellow nutgrass and quackgrass, according to agronomists Bill Furtick and Dave Chilcote. Eptam may control German mesquite, too.

These weeds infect large acreages of high-quality river bottom soils. The chemical is selective on field and sweet corn, snap beans, carrots, transplant strawberries, potatoes, and small-seeded legumes, and possibly others.

Three to six pounds per acre of chemical, thoroughly disked in the soil immediately after application, is recommended. This treatment should give season-long control.

Eptam also effectively controls several common annual weeds. One is watergrass (barnyard millet), a grass that plagues irrigated regions in both eastern and western Oregon. Two pounds per acre are suggested for row crops such as corn, beans, and sugar beets. Several other annual grasses and broadleaves will be controlled, too.

Eptam has proved a good selective grass killer for small-seeded legumes, such as alfalfa, clovers, and birdsfoot trefoil (lotus), according to the agronomists. In fact, it appears a promising method for excellent weed-free legume establishment—especially birdsfoot trefoil. Weedy grasses have limited use of birdsfoot trefoil as a hay and pasture legume, primarily due to difficulty in getting a stand.

Eptam tilled into the soil at planting time resulted in vigorous legume growth. Eptam-treated trefoil even tried to set a seed crop the first year.

More research is planned to find other uses for this new, potent weed killer.

### Eptam evaporates quickly

The research workers found that Eptam is extremely volatile—it quickly evaporates, especially if the soil is moist. That's why they recommend immediate disking after it is applied. Immediate irrigation will carry the chemical into the soil and gives good control—but only on annual weeds. Attempting to "luck out" with rain is risky. Eptam volatilizes in a few days after application if not mixed immediately in the soil.

Commercial sources indicate sufficient supplies will be on hand for 1959, says Furtick. Best guess on price is about $4 a pound, but this may drop some by the 1960 crop year.

## Eptam Controls Variety of Weeds

| Crop | Rate/acre | Application | Weeds controlled |
|---|---|---|---|
| Field and sweet corn, snap beans, carrots, transplant strawberries, potatoes, small-seeded legumes | 3-6 lbs. | Disk into soil immediately after application. | Yellow nutgrass, quackgrass, possibly German mesquite, and several grass and broadleaf annuals. |
| Irrigated corn, beans, and sugar beets | 2 lbs. | Either disked (see above) or through irrigation system. | Watergrass and other grass and broadleaf annuals. |

DDT dusting still is recommended to control onion maggots in the fly stage.

# New Control For Onion Maggots

New organic phosphates kill maggots, can be mixed with a fungicide.

A PRACTICAL CONTROL of onion maggots—pesky insects that have troubled Oregon growers for many years—is suggested from recent research results by entomologist H. H. Crowell.

Use either ethion or Trithion granules. They are new organic phosphates that have been or soon will be approved by the Food and Drug Administration for use on onions.

These phosphates have controlled onion maggots in Crowell's tests in the Malheur and Lake Labish areas of the state.

Two other phosphates—Guthion and Diazinon—appear promising. Guthion has not yet received FDA approval, and Diazinon is registered only as a liquid furrow drench.

Onion "maggots" pass through four stages. Eggs are laid on or near the base of onion plants. These hatch, and larvae—or maggots—feed on the base of onions, killing small plants and ruining large ones. Larvae develop into pupae, then flies. Adult flies are slightly smaller than the common house fly. Two or three generations appear each year in Oregon. First flies emerge in the spring after overwintering in the soil as pupae.

In recent years, onion growers have relied on DDT dusts or sprays to keep the insects from crippling stands. Since female flies cannot lay eggs for a week to two weeks after emergence, growers have found DDT effective.

But Crowell figures DDT control will be only temporary. If these flies repeat the story of other insects, DDT resistant strains will emerge. That's one reason he's been testing, in his current research program, the ability of other insecticides to control maggots.

Maggots have recently taken heavy toll of onions in Oregon. An estimated half to three-fourths of the crop was lost from 1,200 acres in the Lake Labish area in 1953. Losses due to maggots also were great the next two years in the Willamette Valley. In 1956 the same story was repeated on about 1,400 acres of onions in Malheur County. Idaho and eastern Washington growers reported trouble in 1956, as did those in Michigan, Illinois, Wisconsin, and eastern Canada in 1957.

The organic phosphates found effective are applied at planting time to control the pest in the maggot stage. The granular form is suggested, applied in the furrow at seeding time. About one pound of active chemical is recommended—40 pounds of 5% granules. Machines are available that can be attached to seeders which accurately meter granules.

### Mix with fungicide

Western Oregon growers have applied a fungicide—usually a formaldehyde drench—to control onion smut. However, plant pathologist E. K. Vaughn reports one pound of active captan per acre has been found effective. This means captan powder can be mixed with phosphate granules for furrow application. For those using the formaldehyde drench as the fungicide, adding the liquid phosphate Diazinon has been suggested. But Crowell reports research has yet to determine if this insecticide is satisfactory in Oregon.

Using phosphates for maggot control in onions for green-bunching is not suggested. More research is needed to determine if residues remaining on the onions is much greater than on longer-cropped dry onions.

### Not resistant to DDT

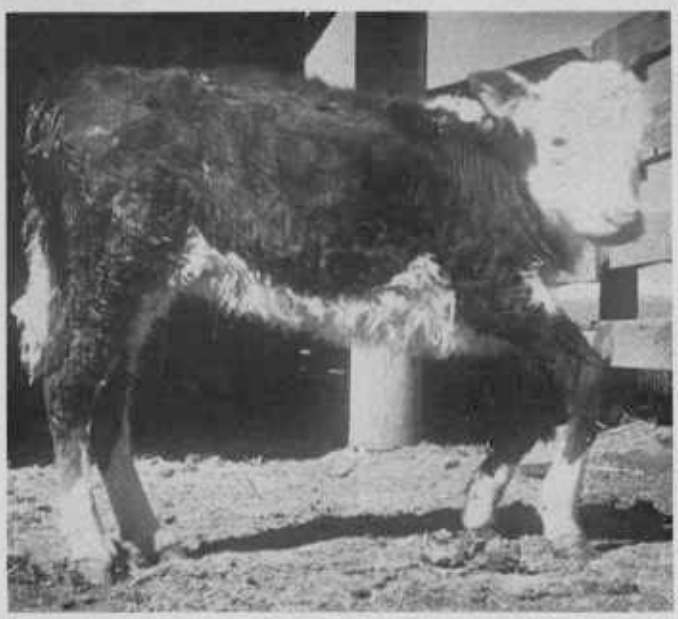
Crowell advises continued use of DDT dusts for flies as added insurance.

The resistance story for onion maggots differs considerably from that of house flies and other insects, according to the entomologist. DDT usually is the first insecticide to which they develop resistance. Resistance to chlordane, heptachlor usually follows. But with onion maggots, resistance to chlordane and heptachlor came first, and flies have yet to develop marked resistance to DDT, although they are expected to.

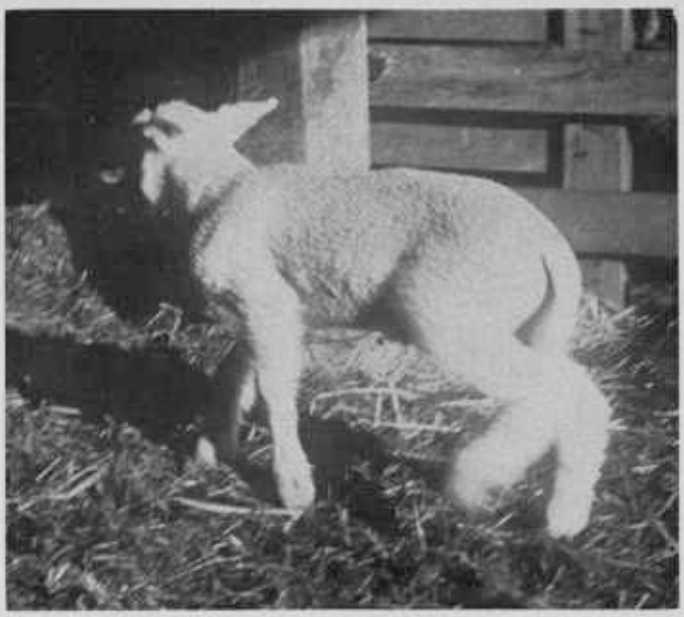
There also appears considerable variation in resistance according to location. Flies in Oregon appear to resist many of the insecticides that have controlled the insect in Canada and eastern United States.

MAGGOT control by ethion, a new organic phosphate, is shown for two rows at right. Left two rows received no insecticide. About 1 pound of active chemical per acre was used in these Malheur County plots. The granular form is recommended, applied in the furrow at seeding time in spring to control pest in the maggot stage.

HEALTHY and maggot-infested onions are shown above. An estimated three-fourths of the crop was lost from 1200 acres in Lake Labish in 1953. 1956 losses in the Malheur County area also were high.



**WHITE MUSCLE** symptoms usually are visible, like those on the above calf. Weakness of forelegs and shoulders makes walking and feeding difficult.



**LEG STIFFNESS** often occurs in lambs suffering from white muscle. This lamb's hind legs were severely affected. It had difficulty standing and walking.

# Selenium Reduces White Muscle

Pregnant ewes fed hay from a "white muscle" area but supplemented with small amounts of selenium produced primarily disease-free lambs. Nonselenium-fed ewes had white muscle lambs.

A CONTROL APPEARS promising for a livestock disease which has plagued ranchers since the 1920's.

The disease: White muscle.

The probable cause: A nutritional disorder involving selenium.

The possible control: Selenium-containing feeds, such as linseed oil meal.

If such control proves practical, it will cap an intensive five-year effort by a team of OSC research workers to find the cause and cure of a disease that has hit some Oregon herds and flocks hard. Some ranchers have lost more than half their lamb or calf crops.

White muscle-afflicted animals usually die within two months after birth. Their hearts and sometimes other body muscles are marbled with white lesions. Lesions in limb or back muscles usually cause stiffness. This can be severe enough to keep an animal from rising, and death from starvation usually follows. Other signs may include a watery swelling under the skin.

### White muscle a nutritional problem

Symptoms may occur any time from birth to several months of age. And sometimes, animals may recover without treatment. Several breeds of both cattle and sheep have been involved.

A majority of cases in Oregon has been found among calves and lambs whose dams had been wintered through the latter part of their pregnancies on legume hay—alfalfa or ladino clover. Hay quality was nearly always above average. However, lower disease incidence was noted among animals that had been on range most of the winter.

Early research elsewhere pointed to a Vitamin E deficiency. Cornell workers in 1945 reported "stiff lamb" disease could be produced experimentally by feeding ewes alfalfa and cull beans, and prevented by feeding vitamin E to ewes or injecting the vitamin into lambs. In 1951, Michigan researchers produced heart lesions by feeding a liquid diet deficient in vitamin E. Then in Scotland, Ayrshire calves pail-fed skim milk fortified with cod liver oil at recommended levels developed severe muscular dystrophy. The researchers there suggested that cod liver oil acted in destruction of dietary vitamin E.

But evidence in Oregon indicated

more than a simple vitamin E deficiency was involved. For one thing, hay with better than average vitamin E levels was producing white muscle in calves and lambs, while poorer hay lower in vitamin E was not implicated. Further, in trials conducted on farms, supplementing diets of bred ewes with vitamin E during late gestation failed to protect their lambs from white muscle disease.

### White muscle produced

In 1953, a team of OSC research workers attempted to produce white muscle experimentally. As reported earlier (*Oregon's Agricultural Progress*, Fall, 1956), this experiment was successful. It has been repeated several times, resulting in a high incidence of white muscle in lambs and calves. Procedure has been fairly simple. Hays from ranches where white muscle has struck were fed as the sole ration to pregnant cows and ewes the last half of their pregnancies. Animals had no previous white muscle history.

In 1957, the researchers—veterinarian O. H. Muth, animal husbandman J. E. Oldfield, and agricultural chemist J. R. Schubert—attempted to test preventative treatments. One was vitamin E, the second selenium, a mineral trace element. Selenium was chosen because it appeared to be involved in curing certain muscular difficulties in chicks and laboratory animals.

Five groups of 12 pregnant ewes each were used. Each ewe was fed a

**NORMAL-appearing calves can suffer from white muscle heart failure, as did these OSC animals.**

daily ration of four pounds ladino clover clippings plus one-fourth pound of ground oats. Treatments were:

- Lot 1—control—hay from western Oregon, from a ranch free of white muscle disease.
- Lot 2—hay from white muscle areas plus vitamin E by injection.
- Lot 3—same as lot 2, except vitamin E was fed, mixed in oats.
- Lot 4—hay from white muscle area plus 0.1 ppm selenium in total ration added to oats.
- Lot 5—hay from white muscle area alone.

Results: Only lambs from ewes in lots 1 and 4 were substantially free of white muscle. In lot 5, 11 out of 15 were afflicted; lot 2, 11 out of 15 were affected; lot 3, 16 out of 20; and lot 4, (selenium fed) only 3 out of 16 were afflicted, and these only slightly. Only 1 out of 18 from lot 1 was affected.

### Excess selenium poisonous

While results indicate the protective effects of small amounts of selenium, the researchers caution that more experiments are needed before recommendations can be made. For one thing, selenium in excess is a poison. Concentrations equal to about a kernel and a half of wheat in a ton of feed were used in the experiment.

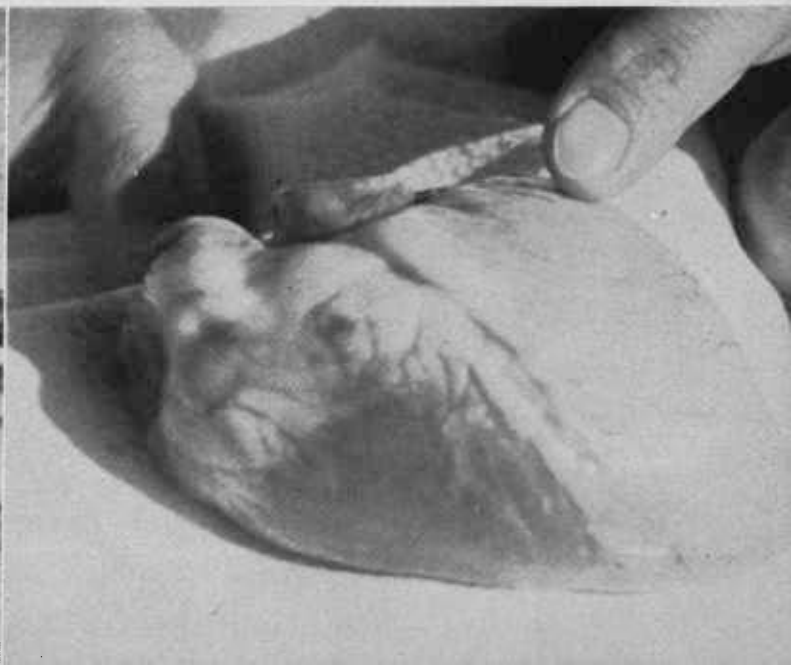
Future experiments involve testing rations that contain selenium naturally. One of these—linseed oil meal—may contain enough selenium to prevent white muscle.

Even if a practical ration that protects animals from white muscle can be found, the research workers are left with more basic questions. If selenium is involved, by what mechanism is white muscle produced? Are soils in white muscle areas deficient in available selenium? Do different plants vary in their ability to take up selenium? Can the animal store selenium? What is the cheapest and best method of supplying selenium?

More research is needed before the white muscle puzzle is completed.

**DARK AREA in photomicrograph shows abnormal calcium deposits of white muscle tissue. Upper part of photo shows normal, uncalcified muscle tissue.**

**WHITE MUSCLE calf heart shows extensive damage. Entire right side is covered with white muscle tissue. Normal muscle shown in lower left of photo.**



A mechanical harvester for Willamette Valley bush beans? Last summer at OSC . . .

# Tests Show Promise For Bean Harvester

BEANS conveyed to rear of machine were collected in sacks during OSC trial demonstration. In commercial harvesting operations, beans drop into half-ton capacity pallet boxes mounted on rear platform.

A MECHANICAL BUSH BEAN HARVESTER "looks good" for the Willamette Valley. But it will be several years before anyone knows if the harvester, along with Blue Lake type bush beans, will replace much of the state's pole bean acreage.

This sums up the opinion of OSC research agricultural engineers, horticulturists, and food technologists, following extensive tests last summer.

A machine manufactured by a New York firm harvested OSC experimental plots and commercial fields of bush beans. Harvestings of both commercial bush varieties and bush lines from Blue Lake backcrosses (See *Oregon's Agricultural Progress,* Winter, 1957) were compared.

Present harvesters cost about $12,000. With Blue Lake pole beans yielding 4 to 5 tons per acre more than hybrid bush beans, local growers have been able to absorb higher picking costs (about double those of the harvester) by maintaining higher production of top quality beans.

### Machine removes 90% of the beans

Picking efficiency varied between 75% and 85%, according to agricultural engineer J. B. Rodgers. The machine removed at least 90% of the beans from vines but about 15% fell to the ground from the spinning picker reel.

Two picking reels, one on each side of the tractor, are located between the front and rear wheels. Two pairs of gathering units in front of the harvester lift and guide bean plants into picking reels and concaves, where plants come in contact with rotating picking reels. Beans and most of the leaves are stripped from the plants and deposited on a conveyer belt under the tractor. The mixture of beans and leaves is moved rearward to the cleaner where leaves and trash are removed. Clean beans are elevated either to the bagging unit or pallet boxes. The harvester picks two rows at a time.

Rodgers noted that the machine needed better control of forward speeds to handle the Willamette Valley's heavily vined bushes. An auxiliary transmission was installed that gave 12 forward speeds with a low speed of about three-fourths of a mile per hour. The machine normally has a 4-speed transmission.

MECHANICAL bush bean harvester covers 3½ to 5 acres a day, travels about three-fourths mile an hour, picks from 15 to 20 tons of beans a day.

HORTICULTURIST W. A. Frazier examines Blue Lake-bush backcross he has developed. Backcrosses have approach Blue Lake quality in a bush type plant.

In addition to the "throwing" problem (to which there is no easy solution) Rodgers reported the capacity of the cleaner unit must be increased to handle high yielding beans. When the harvester operated down hill, beans tended to pile on the rodded shaker, causing difficulty. The cleaning fan also tended to suck dead leaves against the bottom side of the shaker, shutting off air and causing dirt and trash to mix with beans.

Trials also indicated that mechanically-picked beans cause some difficulties in processing plants. One of the most serious is declustering of pods. Thus, Rodgers thinks a cluster breaker is needed. An auxiliary bean cleaner also would be desirable.

The following table summarizes yield data of harvested beans.

Mechanically-harvested beans also provided a good range of sieve sizes—from 1 to 6, according to horticulturist W. A. Frazier. Most of the tonnage graded I and II.

But Frazier pointed out that more tests with the harvester are needed to answer several questions. For example, it is not known if rainy weather will reduce picking efficiency. Nor does anyone know how much mechanical picking will affect processing quality. Possibly more breakage, more discoloration, and more storage losses would increase processing costs.

More field tests with Frazier's Blue Lake bush backcrosses are needed, too. It is yet unknown if these beans are more susceptible to white mold and other bean diseases.

Frazier's backcrosses appear to approach Blue Lake quality in a bush type plant, and yield about the same as true bush varieties, which is about half the tonnage for Blue Lake pole beans. These backcrosses have the possible advantage of providing a wider range of sieve sizes. A production "peak" in true bushes does not provide such a range.

This year marked the seventh backcross Frazier has completed for his Blue-Lake-bush. He feels that he has transferred much of the Blue Lake pole bean quality in terms of deep green, tender, straight, long stringless pods. His breeding program calls for securing "pure line" varieties from this backcross which in turn will be field tested to check out overall performance. Best estimate is two to three years before seed of his best and latest backcrossed lines will be available commercially.

It may be that long before the bean industry will know how well Frazier's backcrosses will perform elsewhere. If Midwestern growers can come close to matching Blue Lake quality with hybrid bush beans, Oregon's bean industry may be in for some tough competition. But if the backcrosses fail to produce as well as they do here, Oregon will maintain its monopoly quality position, and a mechanical harvester may provide a method for more efficient harvesting.

## Summary of Variety Yields In Bush Bean Harvester Tests

| Varietal type | Total yield clean beans | Harvested by machine | | Left on soil | | Left on plant | |
|---|---|---|---|---|---|---|---|
| | *Tons/acre* | *Tons/acre* | *%* | *Tons/acre* | *% of total* | *Tons/acre* | *% of total* |
| Average of 13 commercial "true" bush varieties | 4.2 | 3.1 | 74 | .69 | 16 | .37 | 10 |
| Average of 9-OSC "true" bush lines | 5.3 | 4.1 | 78 | .83 | 16 | .34 | 6 |
| Average of 18-OSC bush lines from Blue Lake backcrosses | 4.6 | 3.5 | 76 | .78 | 17 | .33 | 7 |

# Research Briefs

**Phosphorus-fertilized hay increases weaner steer gains** • **Students, consumers agree in taste tests**

## Dubbing Layers Increases Egg Production

SNIPPING THE COMBS and wattles from laying hens housed in open cages will increase rate of lay and decrease feed required per dozen eggs.

That's the report from poultryman W. H. McClusky.

He says production of dubbed birds (those without combs and wattles) averaged 64% for two laying seasons, compared to 60% for undubbed birds. Feed required per dozen eggs was 5.06 pounds for dubbed birds, 5.67 pounds for undubbed ones.

McClusky points out that increased efficiency in feed conversion is expected with higher rates of lay, but there appeared more feed wastage with birds possessing wattles. To check this, half the dubbed group had both comb and wattles removed the second year, the other half only had combs removed.

Results indicate completely dubbed birds laid better and were more efficient in feed conversion. Birds with wattles required slightly more feed per dozen eggs, indicating they could have been wasting feed.

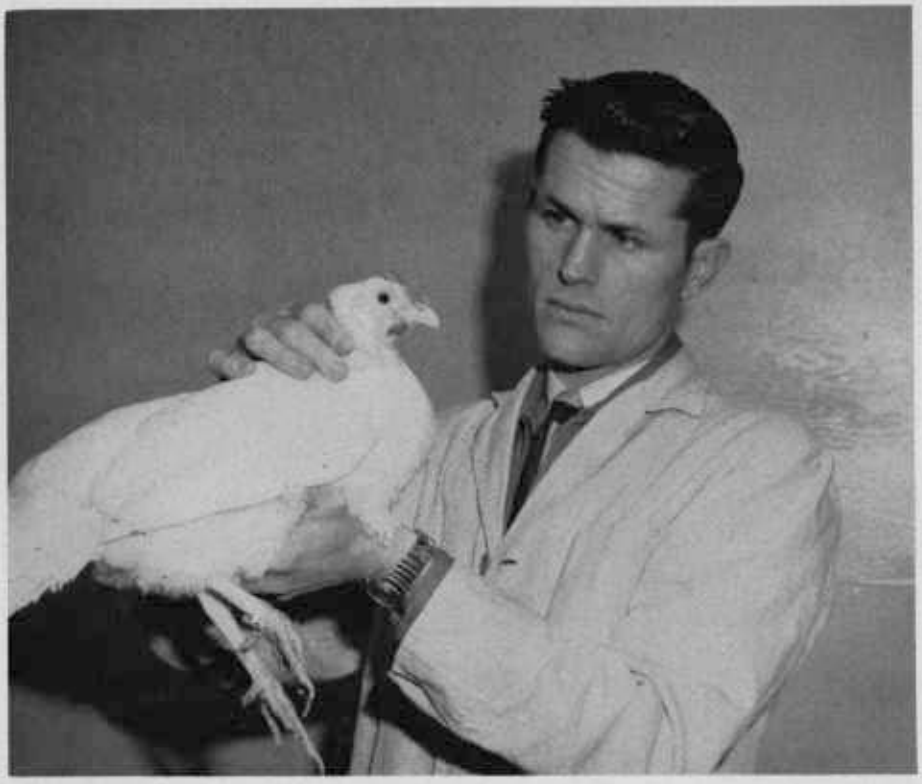
To find if dubbing would increase egg production in floor pens, the poultryman compared response in both housed and open cages. He found no benefit in dubbing birds housed in floor pens.

### Dubbing use rare

Until recently, dubbing has been confined primarily to fighting cocks and breeding males. It has been used with large-combed cocks in colder climates, since freezing temperatures can injure large combs, resulting in low fertility for several weeks. McClusky's preliminary results now indicate dubbing also may be practical on females housed in open air cages—even in mild climates such as Western Oregon's.

This may indicate that more than temperature can influence response to dubbing.

Additional studies are needed to determine if response can be obtained testing different types and sizes of cages.



**POULTRYMAN W. H. McClusky examines a dubbed hen. When housed in open cages, they will lay about 4% more eggs, require about half a pound less feed per dozen eggs than undubbed birds.**

## Consumer, Student Taste Judgments Similar

DO JUDGMENTS of student "taste testers" agree with those of consumers?

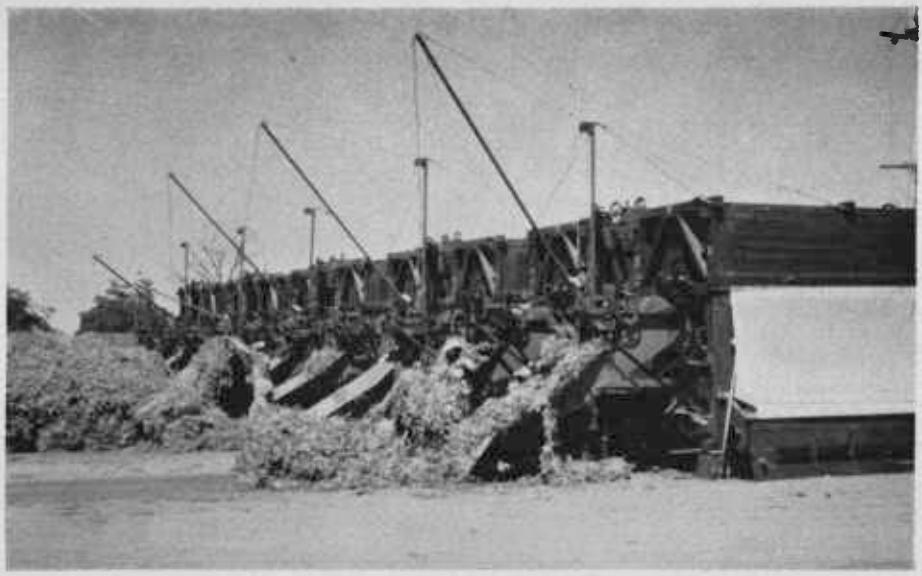
They do, according to statistician Lyle Calvin and food technologist Lois Sather.

OSC student taste panels have been used for several years to evaluate the flavor of many food products. It was feared students may not accurately represent the preferences of consumers. To find the reliability of student panels, Calvin and Sather compared judgments of 150 students with those of 220 urban families.

### Variety of foods tested

Each "taster" judged samples of canned purple plums, blackberry jam, tomato juice, chocolate chips, canned peaches, canned green beans, graham crackers, barbecued potato chips, sweet sliced pickles, cheddar cheese, canned applesauce, filberts, canned corn, tomato soup, and butter. All judges rated these foods on a nine-point scale ranging from "like extremely" to "dislike extremely."

Close agreement was found between the two panels, according to the researchers. They conclude that student taste testing panels can accurately measure consumer food tasting preferences.



**BOTH types of vining use the same general operations, except plant viners are permanently stationed at freezing plants. This permits use of labor-saving equipment, such as electric forks, conveyor belts,**

# Plant, Field Vining Costs Compared

WHICH COSTS more—plant or field vining of peas?

Agricultural economists George Davis and Harvey Hutchings report plant vining costs less—under usual conditions of varying field to plant distances, size of operation, ratio of shelled peas to harvested vines.

With field vining, portable viners are set up close to the field. After harvest, viners are moved to the next location. Vines are seldom hauled more than 2 or 3 miles to portable vining stations. After peas are shelled, they are hauled to a freezing plant. There, they are unloaded, dumped, and empty lugs washed and returned to vining stations.

Plant vining involves the same general operation, except viners are permanently stationed at freezing plants. This permanence permits use of labor-saving equipment such as electric forks, feed regulators, and conveyor belts for shelled peas. Vines seldom are hauled from a radius of more than 20 miles from the plant. Shelled peas are moved by flume, belt, or pump to the processing plant.

Varying distances affect vining costs considerably, according to the economists. The following table shows costs for field vining vs. plant vining for a 20,000 pound-per-hour plant operating a 1,000-hour season with a pea-vine ratio of 20%.

Costs in the table account for all operations beginning with vine loading through clipper cleaning. These costs, while not average for individual plants, are based on labor and equipment standards of performance developed for different jobs making up the vining operation. These standards were determined by economists and industrial engineers through time and production studies, and by examining plant records and equipment manufacturers' specifications. In general, performance standards of labor and equipment selected were above average, but well within the capacity of crew and equipment.

Other studies planned include cost and efficiency of freezing and packaging.

**Plant Vining vs. Field Vining Costs**

| One-way field-plant distance | Plant vining | | Field vining | |
|---|---|---|---|---|
| | Total season's costs | Ave. cost/ 100 lbs. clean peas | Total season's costs | Ave. cost/ 100 lbs. clean peas |
| *Miles* | | | | |
| 5 | $249,401 | $1.25 | $356,824 | $1.78 |
| 10 | 282,791 | 1.41 | 370,384 | 1.85 |
| 15 | 316,181 | 1.58 | 377,764 | 1.89 |
| 20 | 354,341 | 1.77 | 387,764 | 1.94 |

# Phosphorus-Fertilized Hay Increases Cattle Gains

PHOSPHORUS-FERTILIZED meadow hay increased average daily gain of weaner steers by one-fourth pound more than unfertilized hay, report research workers at the Squaw Butte-Harney branch experiment station.

Steers in both groups ate about the same amount of hay—12.8 pounds per day. But feed required per pound of gain was much less for the fertilized hay group, 11.6 compared to 15.4.

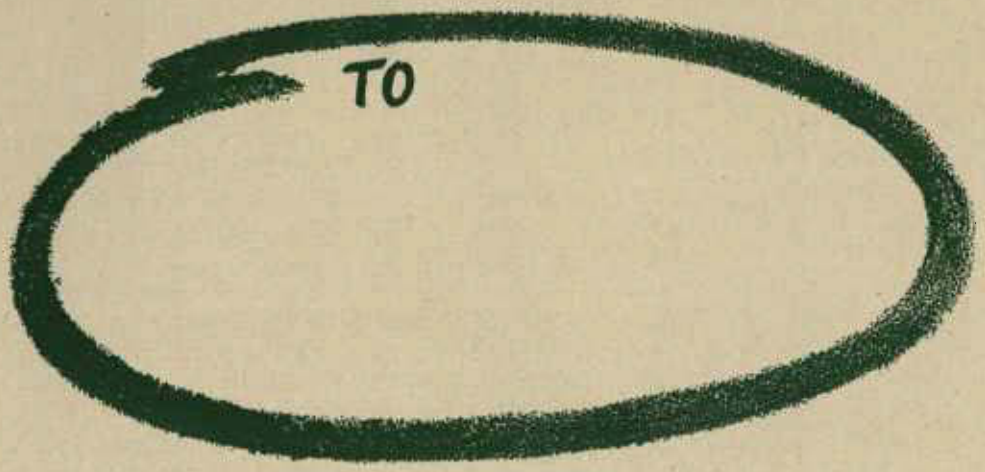
Feed costs per pound gain for the fertilized hay group was 15 cents, compared to 20 cents for the unfertilized hay group, say Farris Hubbert, R. R. Wheeler, C. S. Cooper, and W. A. Sawyer.

These costs were figured at $20 per ton for hay and $60 per ton for barley.

Animals were on feed 132 days—from December 6, 1957, to April 18, 1958. All animals received two pounds of barley per day and had access to 50-50 salt-bonemeal mix. Hay was free choice.

Hay fed was harvested in 1956 and 1957. Fertilized hay had received 40 pounds of $P_2O_5$ in the fall of 1955 and 1956. Fertilized hay analyzed from 1% to 2% higher in crude protein content than unfertilized hay.

At the same time, the research workers report adding one pound of cottonseed meal daily increased daily gains about one-fourth pound in both fertilized and unfertilized hay feed groups—unfertilized hay, 1.12 pounds, fertilized hay, 1.45 pounds. Feed required per pound of gain dropped to 12.2 pounds for the unfertilized hay group, 9.4 for the fertilized hay group. Feed cost per pound of gain dropped to 18 and 14 cents. Cottonseed meal was figured at $70 per ton.

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## Farm Outlook . . .

*(Continued from page 3)*

With the current combination of grain and cattle prices, grass may be a better bet than barley on some diverted wheat acres. But don't plan on calf and yearling prices staying as high as they were last year.

**Cattle:** Profits from cattle feeding this winter won't be as high as last winter, mainly because feeders bid calf and yearling prices up last summer and fall. As a result much of the benefit of low feed prices and strong consumer demand for beef was passed along to the cow-calf operators.

Despite poorer returns to feeders, bidding for the limited offerings of calves and yearlings next fall is likely to be strong enough to keep prices for feeders near the past year's levels. Later, as heifers now being saved start calving, prices will work down again. How low they will go remains to be seen but they may not go as low as in 1955 if weather stays favorable and if the buildup in numbers is more gradual this time.

**Hogs:** The run of hogs to market during February and March, along with sizeable marketings of fed cattle and lambs, is likely to force hog prices down $2 or $3. This may be followed by a moderate recovery continuing until midyear. After that hog prices probably will be on the skids most of the time during the remainder of 1959.

These are the prospects mainly because returns from hog raising have been good enough to encourage a sharp expansion in production, especially in the Midwest. Farmers across the nation plan to farrow 8¼ million sows this spring. That is almost 2 million more than two years ago. Fully three-fourths of the increase is in twelve North Central states; less than 1% is on the Pacific Coast.

Years like 1959 are not unusual for hogs. They are a normal part of the hog business. They are usually followed by reduced production and improved returns to those who stay with hog raising. While this spring is not a good time to start in the hog business, it is a good time to study its possibilities and learn to produce efficiently.

**Sheep:** Lamb prices in recent months have not stayed in step with beef like they usually do. Whether or not this is a temporary condition remains to be seen. Reasons for the unusual spread are not entirely clear; but the increase in imports of lamb and mutton, primarily from New Zealand, is a possible cause. Another possibility is a shift in consumer interest away from lamb toward beef and poultry, despite stepped-up promotion efforts.

Strength in wool markets has been slow to show, but odds are 1959 prices will be no lower than last spring.

**Poultry:** Egg and broiler prices are likely to stay under a year ago at least for the next 3 or 4 months. Stepped-up production in response to last year's more favorable returns are the main reason for the current prospects.

Supplies of frozen turkey are only slightly smaller than a year ago, so there is little chance for price improvement this spring. Prices next fall may be even lower than last fall if early plans to increase production are carried out. There will be more competition throughout the year from pork, too.

**Fruits:** The expansion of strawberry production in California has been checked by the combination of bad weather and low prices in the past two years. The acreage harvested in that state this year will be 30% under the 1957 peak if growers stay by intentions reported last October. Oregon growers have boosted their yields and are holding their ground better. They plan to harvest the same acreage as in 1958 but 16% less than in 1957.

**Potatoes:** For whatever consolation it may be, the figures indicate that Oregon growers and dealers are not responsible for the distressed potato market. Most of the trouble appears to be centered in the North Central states where stocks are half again as large as last January. Idaho with a 13% increase and Maine with a 3% increase helped to boost the nation's total stocks 18% over a year ago. Oregon stocks are only slightly larger and Washington stocks are down much more.

Another consolation—a marketing season like the present one is usually followed by smaller plantings and better prices. Already growers in the winter and spring states are reporting substantial cutbacks in acreage.