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Oregon's Agricultural PROGRESS

Which Feed Combination Makes Best High Concentrate Ration? • Your Stake in the Tax Referral

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Features:

OREGON'S AGRICULTURAL PROGRESS will be sent free to Oregon residents upon request. Address requests to Bulletin Clerk, Industrial Building, Oregon State University, Corvallis, Oregon, or see your County Extension Agent.

COVER: Marketing Oregon-grown feeds through beef cattle has increased in recent years. This Malheur County feedlot is one of a number in Oregon which uses Oregon grains, forages, and by-products in finishing cattle. Interest is still being shown in feeding high concentrate rations. Research results comparing various high concentrate rations with a hay-grain ration are reported on page 13.

D*URING THE WEEK* of September 8th a number of people asked me just what the impact would be on Oregon's agricultural and forestry research and the Cooperative Extension Service if the 1963 Legislative tax program is rejected on October 15. Since I am administratively responsible for these two services here at Oregon State University, I've been getting the facts I need to answer these questions.

Early in September it looked like this: The budgets of all State departments financed from the general fund would have to be reduced by an average of 15% if the 1963 tax program were to be rejected. Some simple arithmetic bears this out. The 1963 general fund amounted to $404 million. The 1963 tax program, which is being challenged, provided for $60 million—14.8% of $404 million.

But then, just as we were translating this into actual budget reductions, the Attorney General released his decision that the basic school fund, which also comes from the general fund, could *not* be reduced if the new tax program is rejected on October 15. This means a $60 million reduction in the general fund must come from the other departments which get their funds from this source—among others, Higher Education and its Agricultural Experiment Station and Cooperative Extension Service.

Now, the Department of Finance and Administration has asked us to supply them with details of how we would cut 1963-65 budgets by approximately 24%.

This 24% comes from some more arithmetic. Basic school support is to get $135 million from the general fund in 1963-65. Subtract this and there is $269 million left to finance all these other departments.

Since $60 million is 22.3% of $269 million, general fund budgets will have to be reduced by 21% to 24%. This

Your Stake in the Tax Referral

By F. E. PRICE
Dean and Director of Agriculture
Oregon State University

is the base we in Higher Education must use to estimate our overall reductions in State general funds.

It was on this basis, too, that I started to project the minimum budget reductions that are almost certain to occur in the Agricultural and Forest Experiment Station and in the Cooperative Extension Service if the 1963 tax program is rejected on October 15. If we are to feel the full brunt of this cut, and if the cuts are made equally, this would mean a reduction of $1,492,552 in the Agricultural Experiment Station budget and a reduction of $1,079,480 for the Cooperative Extension Service.

Applying a reduction of this size to Agricultural and Forest research here, first we would cut funds for new Experiment Station service buildings. As an example, this eliminates a building our livestock industry believes necessary for evaluating *all* research on meat animals and meat quality—the Meats Laboratory. We couldn't build the new Swine Barn, either. With the other construction which would also be curtailed, this adds up to a budget cut of $230,000.

Second, I would turn to reducing the operating expenses (material and supplies, etc.) of our several departments. But here, operating expenses for research have already been cut severely for this biennium by the 1963 Legislature. Further reductions don't look practical unless we actually reduce our research staff!

Next, applying a 24% cut to where we do research on local problems—the Branch Experiment Stations in different parts of the state—means reducing their operating funds by at least $129,000.

I don't think certain of these branch experiment stations could be operated effectively with such a reduction. Some would have to be closed. Further reductions at the others would damage their research seriously. Nonetheless, let's assume a budget cut of $129,000 from branch stations. This plus the $230,000 from service buildings comes to only $359,000.

This still leaves $1,133,552 to be cut and I believe it can only come by reductions in the research staff. It's a fair estimate, I believe, that we would have to eliminate one full scientific position to bring about a budget cut of $11,000. This includes salary, lab assistants, materials, supplies, etc. On this basis we will have to dismiss *68* professional research scientists. This would be such a drastic, sweeping cut that well-trained scientists will avoid Oregon for many years to come.

The Cooperative Extension Service has no building funds, so their materials, supplies, and travel would be reduced. This wouldn't go far toward meeting a $1,079,480 budget reduction. To do it, some Extension Service people in the counties and staff at Corvallis would have to be dropped. This would seriously curtail our programs in Home Economics and Agriculture to say nothing of work with the 4-H Clubs.

In concrete terms the Extension Service would have to discharge about *64* County Agents, specialists, and other Central staff. This means their salaries, their clerical help, their supplies and travel.

Impact shocking

I'm shocked and I'm sure you are to see the impact of this possible reduction on Forest and Agricultural Research and Cooperative Extension work. It has taken all of us years to build the staff that now has high standing throughout the country. The teaching program on campus can suffer equally and I wish I had the space to discuss that with you, too.

It may all be toppled in a day—October 15.

I have tried to give you the facts to help you in your decision on October 15.

(Continued, page 16)

Subclover for $20 an Acre?

Thanks to research, you can establish and produce subclover for less than $20 an acre. Cost saving comes from mixing lime-superphosphate with inoculated seed before seeding. Several treatments were compared.

This second-year subclover growth was obtained when 2 tons of lime were applied at seeding time. Sixty pounds of P_2O_5 were applied annually. No nitrogen applied.

COST OF ESTABLISHING subclover on western Oregon hill soils can be reduced materially simply by mixing lime and phosphorus with your seed at planting time. Three years' research by OSU Agronomist William McGuire and Soil Scientist Murray Dawson have produced 100% establishment on almost all trials when seed also has been inoculated with effective strains of rhizobia bacteria.

Key to the lower cost is creating the right conditions for clover establishment around the seed only—not for soil in the entire plow layer. Total fertilizer needs are about 200 pounds of lime and 200 pounds of 20% super phosphate per acre. (This provides 40 pounds of P_2O_5. If a soil test reveals P_2O_5 values less than 15 pounds per acre, it may be necessary to increase the lime-superphosphate mixture to 800 pounds per acre. This would consist of 400 pounds each of lime and superphosphate.)

Lime added

Lime is added to the superphosphate 10 days before seeding so the mixture will be chemically neutral before it is mixed with inoculated subclover seed.

Incorporating lime-superphosphate with inoculated seed changes soil acidity around the seed sufficiently to permit rhizobia bacteria to multiply rapidly and invade seedling root hairs. This usually takes from 3 to 4 weeks for subclover. The importance of rhizobia bacteria for establishing subclover was discussed in the Summer-Fall 1961 issue of *Oregon's Agricultural Progress.*

The process works like this: lime and superphosphate mixed with inoculated seed create the proper environment for rapid multiplication of rhizobia bacteria and their infection of healthy subclover root hairs. Bacteria must be available for invasion of root hairs if the subclover plant is to manufacture its own nitrogen. And nitrogen is essential for plant growth.

Methods compared

McGuire and Dawson compared the success and failure of several methods for establishing subclover, including the one described above. Other methods were: no lime and no P; no lime, P banded at seeding; 2 tons of lime per acre applied before seeding plus P banded at seeding; and 3 to 4 pounds of lime per acre applied as a seed coat (pellet) plus P banded at seeding. Seeds in all trials were inoculated with rhizobia bacteria. Seeding was completed in the fall at 10 locations throughout western Oregon.

Subclover plants were lifted during the winter and the number that had been effectively nodulated were counted. Data for three experiments (1960-62) at the OSU Adair Research Farm are presented in the table. Similar results were obtained at the other locations except for one in Marion County, where the stand was lost. Soil tests revealed that a severe magnesium deficiency apparently had interfered with effective nodulation.

Seedings successful

Results suggest that subclover can be established and produced successfully on acid soils between pH 5.0 and 5.5 by modifying the seed-soil environment with a lime-superphosphate mixture that is mixed with inoculated seed.

In addition, results show that on infertile hill soils—typified by the Adair location—phosphate and lime, either in small amounts next to the seed or in large amounts incorporated in the soil, are required for full establishment and good production the first year.

Pelleted seed treatments were only partially successful. Typical results show that it takes two to three years to achieve the forage production equal to the lime-superphosphate mixture.

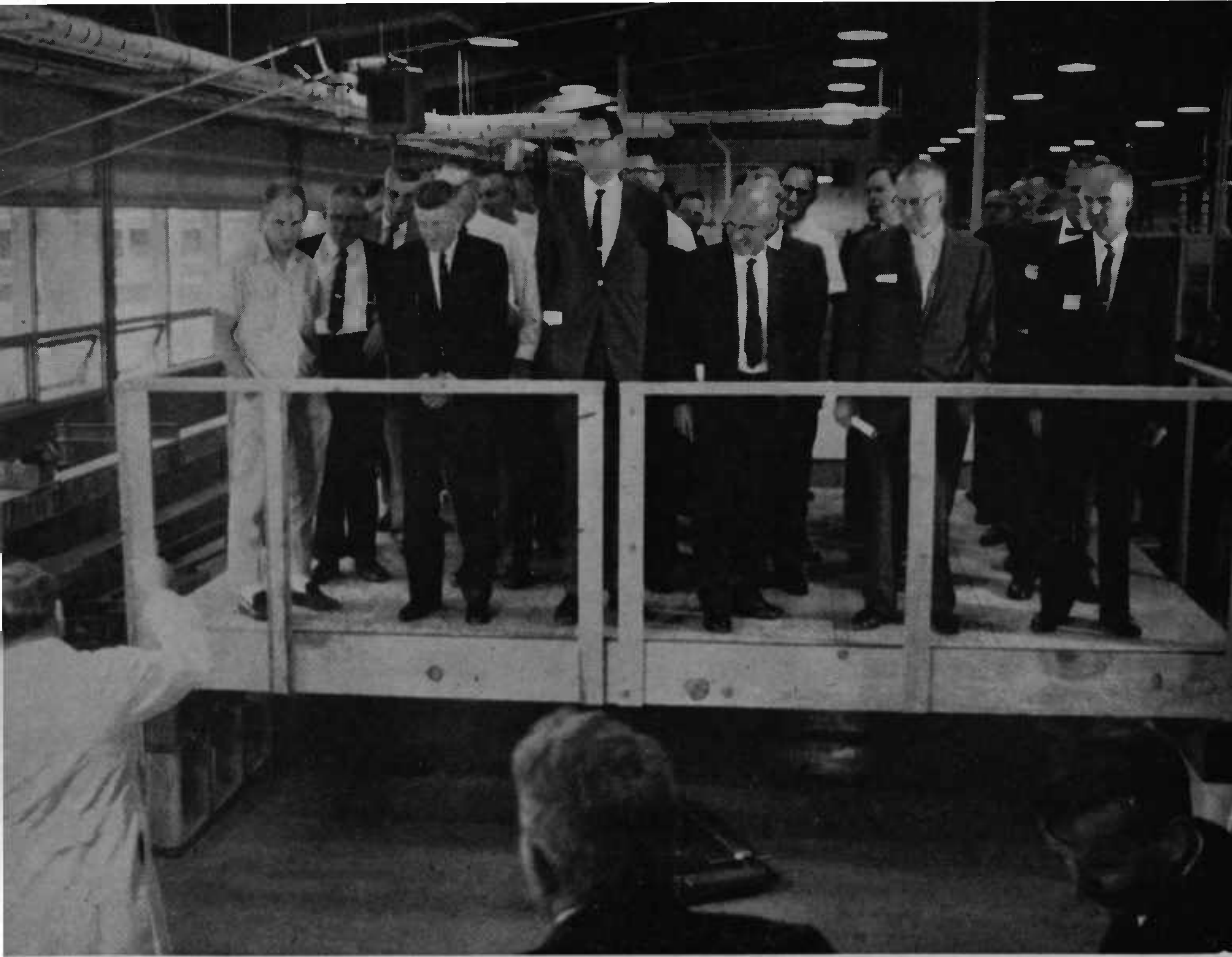
Cutting the cost of subclover establishment means that more than a million acres of open hill lands and depleted cropland in western Oregon can be developed. McGuire and Dawson report yields of up to 3 tons of dry subclover forage per acre after the establishment season. This represents a high quality feed sufficient to produce 400 pounds of meat per acre if it is fed before drying on the ground.

This second-year subclover growth obtained when 300 pounds of lime were mixed with 60 pounds of P_2O_5 and drilled with seed. Grass shows effect of N fixation.

Lime, Phosphate Affect Subclover Establishment

Fertilizer treatment	Effective nodulation—OSU Adair Research Farm 1960	1961	1962
	%	%	%
No lime, no P	....*	3	19
No lime, P	77	....	60
Lime-super P mix	94	100	100
Lime (2 T/A broadcast), P	91	42	86
Lime-pelleted seed, P	93	10	....

* No treatment applied. Soil pH values for each year were 6.0, 1960; 5.2, 1961 and 1962.



Test floors were designed to support safely a load equal to the weight of these 36 men on an area of 12 by 13 feet. One set of floors used 2-by 10-inch Utility grade joists, while another set used 2-by 8-inch Standard and better joists.

Use Utility Grade Lumber for Joists

You can increase performance and may decrease construction costs by using utility lumber for joists.

YOU MAY BE able to save on costs of constructing farm buildings by choice of grade and size of structural members, say engineers at OSU's Forest Research Laboratory.

Tests directed by George Atherton indicate that floors with joists of Utility grade lumber are adequate in all respects when recommended practices for construction are followed. Comparative results from two floors showed that a floor with 2- by 10-inch Utility grade joists was about 40%

stiffer and about 90% as strong as a similar floor with 2- by 8-inch Standard and better grade joists.

Douglas fir structural lumber is a product long familiar to agricultural Oregon. Its uses range from the diving board at the old swimming hole to framing for houses, barns, sheds, and other buildings. Grades most common for structural applications are Construction and Standard, but Utility—the next lower grade—also is an economical, serviceable material for applications where appearance is not important. Price of Utility grade 2-inch lumber varies from about three-fourths to as low as one-half the price of a commonly marketed mixture containing three-fourths Construction and one-fourth Standard grade lumber. A simple calculation will show which of the grades and sizes is most economical for the intended use.

Note allowable span

Allowable span for various joist spacings and sizes and grades of joists may be found in the *Douglas Fir Use Book* (West Coast Lumbermen's Association, Portland 5, Oregon, 1958) and in *Minimum Property Requirements* (Federal Housing Administration, No. 300).

Two floors were constructed to demonstrate the adequacy of Utility lumber for joists. Floors were built according to requirements of the Federal Housing Administration (FHA) with joists 16 inches on centers, and with headers, plates, 1- by 3-inch cross bridging, and ½-inch plywood subflooring. No finish floor was applied. The only difference in the two floors was that one had 2- by 8-inch Standard and better grade joists and the other had 2- by 10-inch Utility grade joists. Both floors were tested on a 13-foot span (FHA allowable span for the two materials).

Design load 30 psf

Design load of FHA for residential floors is 30 pounds a square foot (psf) for bedrooms and 40 psf for other rooms. Forty psf is roughly equivalent to the load exerted by 36 men on a 12- by 13-foot floor, as shown in the picture. This photograph was taken during a demonstration for building inspectors. For the demonstration, each of the two floors was marked into 36 equal squares. After each person was weighed, he stood at the center of a numbered square while deflection was read at the midpoint of the joists. Each person then moved to an identically numbered square on the other floor and the procedure was repeated.

Subsequently, a more accurate test procedure was followed, and the two floors were tested to destruction to compare both stiffness and ultimate strength. The apparatus used for these tests is shown. The floor with 2- by 8-inch joists was placed on top of the floor with 2- by 10-inch joists. An air-tight bag was placed between the two floors and connected through a hose to an air compressor. Pressure from the bag served to apply a uniform load to the floor. While a particular floor was being tested, the other floor was braced to restrict deflection. Deflections of each joist at each load were read by means of a surveyor's transit sighted upon a scale attached to each joist. Ultimate strength was taken as the load at which the first joist failed in each floor.

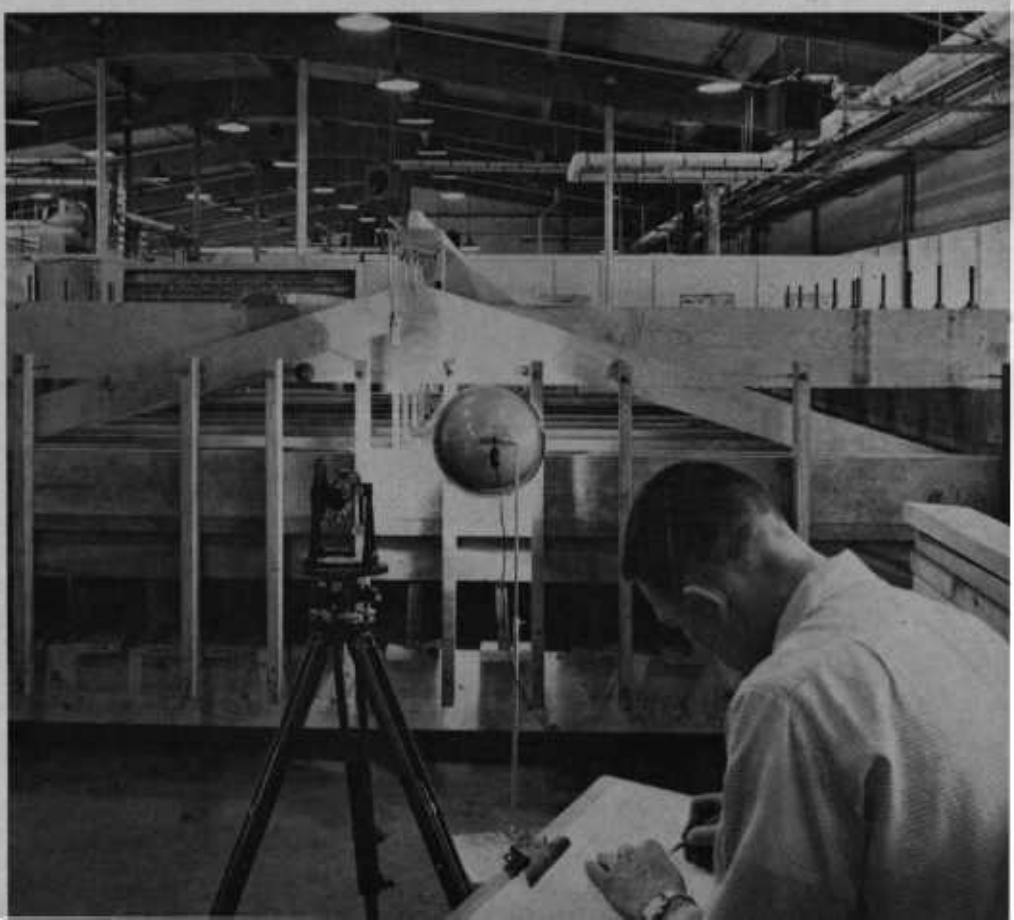
FHA specifications require that deflection of joists may not exceed 0.43 inch for a span of 13 feet when the load applied to the floor is 40 psf. Average deflection for the 2- by 8-inch joists at 40 psf was 0.36 inch, and it was 0.23 inch for the 2- by 10-inch joists, indicating that the lower grade Utility joists were stiffer than the higher grade joists. This was expected, because the Utility joists were of larger size.

Higher grade joists stronger

Although the higher grade joists were smaller than the Utility joists, they proved to be stronger. Load at failure on the floor with Utility joists was 133 psf, or a total load of 20,800 pounds. The floor with Standard and better grade joists failed at 147 psf, for a total load of 22,900 pounds. These loads were 3.3 and 3.7 times the design load of 6,240 pounds.

This study indicates that proper use of Utility grade joists results in a floor that is stiffer and nearly as strong as a floor with joists of higher grade lumber. Simple figuring of required sizes of joists together with local prices of various grades of lumber will reveal which size and grade of structural lumber is most economical in a particular application.

With one floor above the other and an air-tight bag between, stiffness, strength were measured under loads applied by air pressure. Transit measured deflection.



Feed Runty Baby Pigs For Profit

Should you feed your pigs according to weight or to age? One way is most likely to lead to greater profits, according to OSU research tests.

Healthy pigs—whether large or small at birth and weaning—gain at different rates. Differences in rate of gain from 60 to 200 pounds do not depend on either birth weight or weaning weight.

PIGS BORN as runts take longer than their heavier littermates to reach market weight. They take longer for two reasons. First, they are smaller at weaning and have to gain more weight before going to market. Second, they gain more slowly after weaning—thus take longer to reach market weight.

But the low growth rate of runty pigs is not uniform for the whole feeding period, according to D. C. England, OSU animal scientist. Much of the slower growth rate occurs before and just after weaning until runty pigs reach the weights at which heavier pigs were weaned.

Raise runty pigs

The reason for pinpointing why runty baby pigs take longer to reach market weight is that you can now raise runty pigs that formerly died before weaning (*Oregon's Agricultural Progress*, Winter 1963). These pigs are smaller at weaning than the pigs that were heavier at birth. For pigs that are weaned at the same weights, those that take longer to reach market size usually require more feed per pound of gain, but this is not necessarily so for pigs that take longer to get to market because they were smaller at weaning age.

England analyzed post-weaning growth rates of 156 pigs weaned at 7 to 8 weeks of age. Weaning weights varied from above 40 pounds to below 30 pounds. Reading down the 40-60 pounds column in the table, note that growth rates for pigs of lower weaning weight (under 30 pounds) were much lower than for pigs of higher weaning weights. Causes of different weaning weights also cause marked differences in growth rate between 40 and 60 pounds. Growth rates beyond 60 pounds are similar for pigs of different weaning weights. In another experiment, England found that growth and feed efficiency for gains of from 60 to 200 pounds were the same regardless of weaning weights of pigs.

Carcass measurements indicated no difference in carcass value of pigs of high and low birth weight after they reached market size. Those weighing 2 pounds or less at birth and marketed at 212 pounds had carcasses averaging 31 inches long with 1.46 inches of backfat and 3.7 square inches of loin eye. Pigs weighing more than 3 pounds at birth and marketed at 221 pounds had carcasses 31 inches long with 1.49 inches of back fat and 3.7 square inches of loin eye.

Same amount of feed, labor required

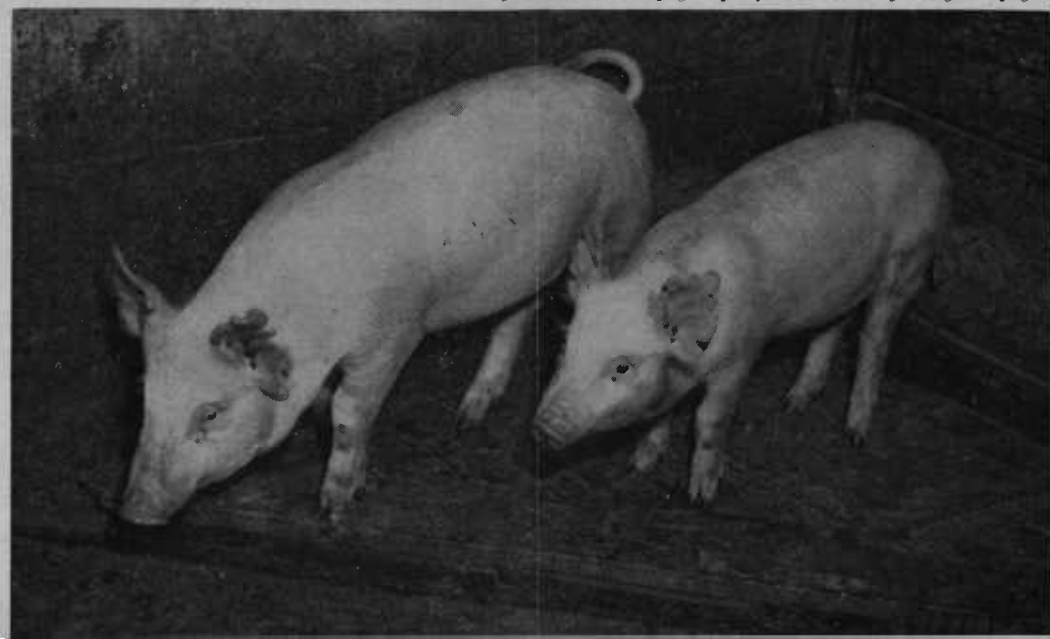
It takes about the same amount of feed and labor for sows during gestation and lactation whether 6 or 12 pigs are farrowed and raised. About six pigs are required to pay costs of the sow. One sow with 12 pigs produces as many profitable pigs as do 3 sows with 8 pigs each. Runty baby pigs—the ones that usually die and therefore do not help pay for the sow's cost—can be the real profit makers when raised. England concludes that the main increase in cost of rearing low birth-weight pigs to market is the cost of feeding them from weaning to the weight at which the heavier pigs were weaned. This takes from two to three weeks. Pigs should be fed according to weight rather than age.

Growth Rates of Pigs Weaned at Different Weights

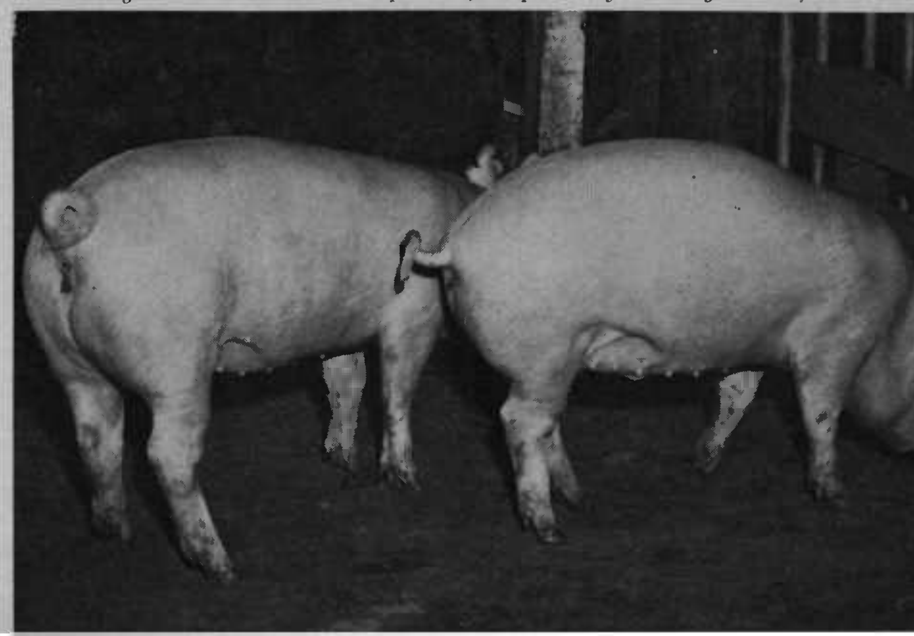
Weaning weight	Average daily gain from		
	40-60 lbs.	60-100 lbs.	100-150 lbs.
Lbs.	*Lbs.*	*Lbs.*	*Lbs.*
Under 30	1.03	1.40	1.50
30-40	1.11	1.43	1.48
Above 40	1.29	1.50	1.51

Birth weights vary from about 1 pound to 4 pounds per pig even in the same litter. Four-day-old pigs shown below had birth weights of 1.8 and 3.2 pounds.

These weaned littermates weighed 3.2 and 1.5 pounds respectively at birth. Note how differences in size at birth increase with age. Smaller pigs perform like younger pigs.



These pigs weigh the same, but pig on left is 2 weeks older than pig on right. Birth weights were 1.3 and 2.7 pounds, respectively. Note good conformation.



Research Isolating Cause

Finding how and why plant viruses are spread

Aphids acquire viruses while feeding on diseased plants and later transmit these viruses while feeding on healthy plants. Winged aphids are most important.

IN THE WORLD of scientific biology, little is known even today about the things that affect the spread of aphid-borne plant viruses. Oregon farmers are faced with about 50 such viruses that attack most crops. And this gap in our knowledge is one reason why virus diseases continue to resist our control—for practical controls are derived from prior knowledge. As long as we know so little about the spread of plant viruses, there is not very much we can do to control them.

A good example is the difficulty experienced with yellow dwarf virus disease in barley. Spread primarily by aphids, insecticides used by farmers were ineffective. One difficulty was that aphids injected the virus into healthy plants before chemicals could kill these insects. Research indicated that early seeding and proper fertilization reduced exposure to aphids and the effects of the virus. And this in turn reduced the amount of virus spread. But this stop-gap control shed little basic understanding on the spread of plant viruses and how to control this spread.

Knowledge is accumulating

Practical controls are still a long way off, but research entomologists are beginning to accumulate the necessary knowledge. At OSU, entomologist Knud Swenson and several graduate assistants are adding to our knowledge and understanding of the conditions that affect virus spread. The research workers have gathered data by field observations and by results of experi-

s for Plant Virus Spread

must come before practical controls are available.

ments in special growth chambers in which, day length, light intensity, and quality as well as temperature and humidity are controlled. In growth chambers the environment of a summer-like day can be repeated for weeks during the winter while researchers trace the effect of a particular condition on the rate of spread of a virus.

Many variables tested

During eight years of research, the entomologists, working with bean yellow mosaic virus and genetically identical pea plants, have examined many variables and conditions that may affect the spread of viruses by aphids. Bean yellow mosaic virus has been found in beans, peas, clovers, and gladioli and has seriously reduced yields in beans, peas, and clovers. Some conditions appear to affect the spread of this virus more than others, and they are described below . . .

¶ The amount of virus available in the plant affects its spread. Viruses vary in the amount available from previous years and from seed-propagating material—such as potatoes.

¶ Viruses vary in the frequency with which they can be transmitted by aphids. Most plant viruses are a complex of strains which can differ in many ways. One of these is the frequency with which aphids transmit them. Bean yellow mosaic virus isolates, transferred artificially, have completely lost their ability to be transmitted by aphids and can not exist outside the laboratory. The important point is the tremendous capacity for viruses to maintain variability—including the frequency with which aphids can transmit them.

¶ Only certain species of aphids can transmit a particular virus. Twenty species in Oregon have been found to transmit bean yellow mosaic virus. And the numbers of each species may vary greatly from year to year.

Sardara Sohi, OSU research assistant, places pea plants in controlled environment chamber to learn effects of different conditions on virus susceptibility.

¶ Aphids vary in their ability to transmit a virus. Of the 20 species found to transmit yellow mosaic, some species were 30 times more effective than others in their ability to transmit a virus. Within a species of aphids, there are races which differ in their ability to transmit several plant viruses.

¶ Plants on which aphids are reared are important. Aphids are sometimes better transmitters when reared on a particular kind of plant compared to another. Aphids taken from colonies reared on aphid-crowded plants were better transmitters of bean yellow mosaic virus than aphids from uncrowded colonies on vigorously growing plants.

¶ Aphid movement from plant to plant is affected by the weather. Strong winds will carry aphids farther than calm air and thus increase the virus spread. Migrating aphids can be re-

OSU entomologist Knud Swenson examines artificially reared aphid colonies. Large numbers of insects are raised for use in virus-transmission experiments.

garded as part of an aerial "plankton" along with pollen. Winged aphids are unable to control their flight if there is any wind, and they appear unable to distinguish between suitable and unsuitable host plants until they alight on the plant and begin feeding. If a plant is unsuitable, aphids are likely to move on very soon. Even when a plant is suitable, many species stay only long enough to deposit a few young before moving on. This constant movement is ideal for virus spread.

¶ Use of insecticides can sometimes increase virus spread. It has been demonstrated that insecticides on sugar beets increased the amount of beet yellow virus spread compared to that of untreated fields. Presumably, the aphids became unusually active just before being killed. This increased movement caused an increase in virus spread.

Temperature affects virus

¶ Temperature affects virus spread. When pea plants were exposed to temperatures in the 58° to 90° F. range for two days *before* inoculation, four times as many plants were infected at 58° than at 90°. The number of infected plants increased by 27% for every 5 degrees of temperature drop below 90°. High temperatures, however, increased virus spread *after* inoculation. Almost three times as many were infected at 90° than at 58° after they were inoculated with a virus.

¶ Use of irrigation did not affect virus spread. Large differences in the amount of water supplied to plants did not affect their susceptibility to the virus.

¶ Simultaneous increases of nitrogen, phosphorus, and potassium produced an increase in the number of plants infected with bean yellow mosaic virus. The reason for this increase is not yet understood. When rates of nitrogen, phosphorus, potassium, and calcium were varied separately, no effect on susceptibility to virus inoculation was found. Several minor elements also had no effect.

This is about where our understanding of aphid-spread viruses brings us. It is hardly enough to develop and test controls for reducing the spread of these viruses, but it is the first big step for acquiring the necessary knowledge upon which such controls will be based.

Research Tests . . .

High Concentrate Rations For Fastest Beef Gains

HIGH CONCENTRATE rations usually produce excellent gains for cattle feeders. But some rations produce better gains than others, and feeders are likely to encounter special problems, according to E. N. Hoffman, superintendent, Malheur Experiment Station, and J. E. Oldfield, animal nutritionist at Oregon State University.

Two years of testing various high concentrate rations have shown that barley, corn, and milo can all produce excellent gains. In addition, steam-rolled barley produced faster and cheaper gains than dry-rolled barley.

Typical experiments used 4 lots of 10 steers each. Each lot was fed a different high concentrate ration. The protein supplement in each ration was fortified with 750 I. U. vitamin A per pound of food eaten. The four high concentrate rations are described in Table 1. Barley was dry-rolled for lot 2; steam-rolled for lot 3. In addition, a fifth group of steers (lot 5) was fed a conventional ration of ground ear corn and alfalfa hay. Cattle were on feed for 154 days.

Table 1. Ingredients of Four High Concentrate Rations

Experimental lot	Barley	Beet pulp	Ground ear corn	Milo
	%	%	%	%
1	50	50	....	....
2	50	25	25	....
3	50	25	25	....
4	....	25	25	50

Treatments compared

With this experiment, Hoffman and Oldfield compared . . .

¶ Different proportions of barley, beet pulp, and ground ear corn (lot 1 vs. lot 2).

¶ Dry-rolled vs. steam-rolled barley (lot 2 vs. lot 3).

¶ Barley vs. milo (lot 3 vs. lot 4).

¶ High concentrate diets vs. conventional hay-grain feeding (lots 1-4 vs. lot 5).

Results are listed in Table 2.

Steam-rolled barley (lot 3) was outstanding. Cost was lowest, however, for steers fed the conventional alfalfa hay-ground ear corn ration. Laboratory tests revealed that protein intake was lower for steers on the high concentrate diets (lots 1-4). This underlines the fact that when alfalfa is fed, lack of energy rather than protein limits gains. High concentrate rations supply abundant energy, permitting faster gains.

The researchers reported that urinary calculi was a problem with animals on the high energy diets. One animal each in lots 2 and 3 was affected after 8 weeks on feed. Stones were found in the uninary tract after emergency slaughter. Salt was added as 2% of the ration for all cattle on high concentrate diets, and no further calculi were noted.

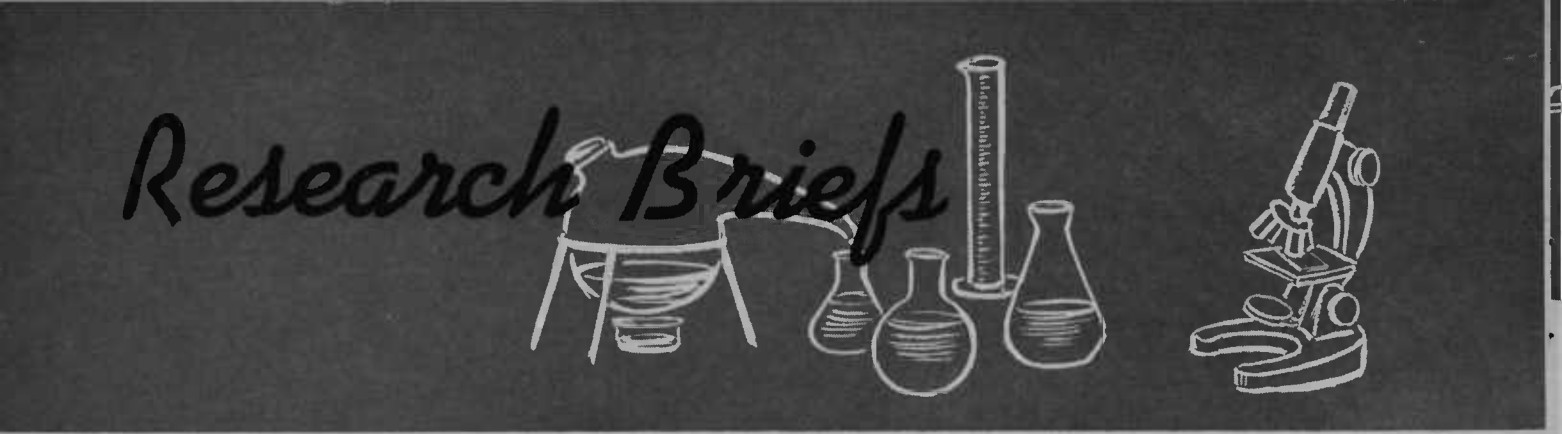
Carcass grades were not as high as live grades would suggest. Deficient marbling was the main problem, and the reason for this is not clear. Extremely rapid gains at a young age may be one reason. Further studies are planned.

High concentrate feeds practical

The tests demonstrate that high concentrate feeding is practical when basic feeds and a simple protein supplement are readily available. The choice of high concentrate vs. conventional grain-hay feeding pivots on local feed prices. Where grain is cheap, feeders can take advantage of higher gains produced on high concentrate rations. Where hay or other forages are cheap and grain costly, a hay-grain ration may be advisable.

Table 2. Performance of Steers Fed Various Concentrate Rations

Experimental lot	Average daily gain	Average feed per pound gain	Feed cost per pound gain
	Lbs.	*Lbs.*	*Cents*
1	2.90	8.07	19.0
2	2.92	8.05	19.2
3	3.18	7.51	18.0
4	2.92	8.46	20.7
5	2.76	9.39	17.4



Ruelene Promising Control for Cattle Grubs

USE OF RUELENE up to mid-December for the control of cattle grubs looks promising, according to research trials conducted by R. L. Goulding, OSU entomologist.

Label instructions restrict the use of Ruelene sprays or "pour-on" applications for cattle grub control after November 1. This limits use in Oregon, since many cattle are still on range in November. The November 1 restriction was placed on the chemical after reports (none from Oregon) indicated that a few cattle developed toxic side effects when the insecticide was applied after November 1. The apparent cause was a toxic reaction to large numbers of dead grubs in the animal's gullet.

Grubs affect cattle in two important ways. Buyers often dock grubby cattle for the larger trim-out required after slaughter. In addition, cattle often "gad" at fly time in the spring and summer which sometimes results in damage to livestock as well as fences and lowers production. Attempts to control adult flies are not practical, so entomologists have developed chemicals to control the insect in the grub or larval stage.

"Warbles" noted in December

Common cattle grubs usually become noticeable as "warbles" or swellings on the backs of cattle after mid-December. By late February or early March, fully developed grubs begin to drop from cattle (via a hole cut in the hide along the back) and pupate in the soil. Flies can become active in winter or early spring, depending on periods of sunshine. This means they emerge earlier in southwestern Oregon and in the Walla Walla and Snake River Valleys than in the Willamette Valley or in the mountains of eastern Oregon. The flies lay eggs on legs and flanks of cattle, often causing "gadding." A fly is about the size of a small bumble bee. It is seldom seen by humans. Its flight is evasive and erratic.

Eggs hatch soon after they are laid, and larvae move to the base of a hair shaft and burrow under the hide. They migrate through muscle tissue to the animal's gullet where they feed until summer. They then migrate to just under the hide along the backbone and grow into full-size grubs or "warbles."

"Pour-on" treatments can be used either for a single steer or in a large feedlot. Minimum of handling facilities and application equipment is required.

Second grub attacks cattle

A second grub, the Northern cattle grub, follows almost the same development as the common grub, with three exceptions: "Warbles" appear later in the winter, flies are active later in the spring and summer, and grubs do not congregate in the gullet.

Goulding tested Ruelene "pour-on" at recommended rates on 200 animals from 6 herds—all in different sections of Oregon. All tests were conducted between November 1 and December 15. No ill effects were noted, and grub control was excellent. He hopes that further observations and tests this winter will provide sufficient information for a change in the label recommendation regarding treatment after November 1.

Co-Ral, another organic phosphate systemic insecticide, will also be available for use either as a spray or as a "pour-on." Previous research with this material indicates that a very thorough spray application is necessary. Co-Ral dips have proved satisfactory for control of cattle lice as well as grubs. Dips, however, are suited only for large numbers of cattle.

Irrigation plus nitrogen applications will increase yields 10-fold when corn is seeded to "white land" or Dayton soils, according to OSU experimental trials.

Raise Corn on "White Land"

WILLAMETTE VALLEY "white land" soils can produce up to 126 bushels of shelled field corn per acre with irrigation and applications of nitrogen fertilizer, according to experimental field tests.

That's the report from J. L. Andersen and Murray Dawson, OSU soil scientists.

"White land" is the typical heavy, clay, infertile, acid, poorly drained soil that is often seeded to ryegrass. Called Dayton soils by agricultural scientists, "white land" comprises about 150,000 acres of the Willamette Valley.

The potential of Dayton soils to increase corn yields through improved management—irrigation and applications of nitrogen fertilizer—is tremendous when compared to better drained, more fertile soils such as Willamette, Woodburn, and Amity.

Ten-fold increase

A one-year experimental study on each of the four soil types disclosed that yields could be tripled on Willamette, Woodburn, and Amity soils by use of irrigation, 180 pounds of nitrogen per acre, and plant populations averaging 22,000 per acre. Similar management of Dayton soils, however, meant nearly a 10-fold increase in corn yields. Total yields for the better soils were higher than for Dayton soils (155 bushels vs. 126 bushels), which one would expect, but the soil scientists point out that through proper management of Dayton soils (use of irrigation plus 180 pounds N per acre) corn yields can be increased tremendously (13 bushels vs. 126 bushels).

Use of irrigation (schedules were determined by moisture stakes) and higher nitrogen rates (180 pounds of N rather than 60 pounds) increased corn yields on all soil types. Highest yields on all soils were obtained by use of irrigation plus the addition of 180 pounds of N per acre.

Shelling percentage increased

Use of irrigation and higher rates of nitrogen on Dayton soil also increased shelling percentage. Such management treatments had little effect on Willamette and Woodburn soils but some effect for corn grown on Amity soils. As with corn yields, the greatest effect of irrigation and high rates of nitrogen was with corn grown on Dayton soils.

Nonirrigated Dayton soils to which 60 pounds N had been applied produced corn which shelled only 64%. Through irrigation and application of 180 pounds of N per acre, this figure jumped to 80%. Eighty-one was the shelling percentage obtained with corn grown on Willamette and Woodburn soils regardless of irrigation and regardless of the two nitrogen rates tested. Use of irrigation and high nitrogen rates increased the shelling percentage of corn grown on Amity soils from 79% to 81%.

Weight of Pituitary Gland Affects Animal Weights

SCIENTISTS HAVE LONG known that the pituitary—a pea-sized oval gland attached to the base of the brain—controls other glands which in turn regulate body processes. The pituitary gland produces thyrotropic hormone, as well as many other hormones.

The thyrotropic hormone in turn regulates the amount of thyroxin that is produced by the thyroid gland. The amount of thyroxin that circulates in our blood controls the body's rate of metabolism—the rate at which food is converted to energy or is stored as fat.

The pituitary gland also secretes the gonadotropic hormone which in turn regulates other glands which control either sperm or egg production.

Animal geneticists at Oregon State University have been interested in the ability of the pituitary gland to produce these two hormones. The geneticists—Ed Plotka and Ralph Bogart—are experimenting to see if growth and reproduction of sheep and cattle can be improved by applying the laws of heredity to the development of the pituitary gland. To do this, more must be known about the relationship between the weight of the pituitary and the amount of hormones secreted. Do heavier pituitary glands secrete more hormone simply because they are heavier or because heavy pituitaries concentrate more hormone per unit of gland?

Pituitaries removed

The geneticists removed the pituitary glands from 47 sheep consisting of 5 breeds. By injecting pituitary suspensions into day-old chicks the effect of gland weight could be measured.

Data showed that the live weight of sheep was due to the weight of the pituitary gland, not to the amount of hormone per unit of pituitary. Thus, differences in growth and reproduction of different sheep breeds appear to be associated with differences in the total amount of thyrotropic and gonadotropic hormones in the pituitary gland. Heavier (and larger) pituitary glands are associated with heavier sheep.

Whether or not pituitary weights can be manipulated through genetic selection remains to be seen.

Let's Maintain Our Quality in Education

By James H. Jensen, *President Oregon State University*

IT'S TIME for some plain talk to the people of Oregon.

When actions of government depend on the vote of its people, it is highly essential that they have an understanding of the issues involved. Many questions are involved in the tax measure that will be voted on October 15.

The tax measure is complex. Its effects on the people of Oregon and their governmental agencies—including public education and higher education—will be far-reaching whether it is supported or whether it is defeated.

Looking to the possible results of *either* a "yes" or a "no" vote has meant that higher education must respond to two different directives. First, the State Board of Higher Education is determined to preserve quality of its many programs. The second has been to answer requests from the State Department of Finance and Administration. Its initial request was to indicate the reductions which would have to be made to bring about an 11% to 14% cut. Its latest request, generated by the Attorney General's opinion that basic school support funds cannot be altered except by the Legislature, asks for information on a 21% to 24% cut in state appropriated funds.

The state agencies involved include the state-assisted colleges and universities as well as agricultural, home economics and forestry research and extension work; the medical and dental schools; and crippled children, mental, tuberculosis and teaching hospitals.

While the prospects of marked reductions in our present educational and instructional programs and the halting of all new construction present bleak outlooks, the long-term view is, unfortunately, even more discouraging. Our state colleges and universities are even now operating on a budget that was reduced from the standard support levels established by the 1961 Legislature.

For the past 10 years educators have been emphasizing that, beginning in about 1964, the number of Oregon students seeking a college education would rise markedly. Actually, the increase has come even earlier. Enrollments at Oregon State University for the past three years have been: 7,897; 9,039; and 10,037. This Fall we expect about 10,450. Current figures from typical high schools around the state tell the story of what Oregon colleges can expect in the next two years:

High school	Number of 1963 graduates	Number of 1963 seniors	Number of 1963 juniors
Albany	291	388	489
Beaverton	285	416	560
Corvallis	325	400	487
David Douglas (Portland)	382	552	718
South Eugene	463	537	619
Grant (Portland)	607	763	747
Klamath Falls	380	422	557
Medford	460	600*	700*
Ontario	127	137	191
Pendleton	201	251	294
South Salem	440	513	703

* Approximate

It's the same story all over the state. And, many of these high school students are the first-born of the young men and women who served in our Armed Forces during World War II.

It is highly urgent that education, as well as our research and statewide services, be given adequate support. These institutions, which have been built so painstakingly and so well over the years and which are ready to serve the people of Oregon, must be sustained.

Your Stake . . .

(Continued from page 3)

I hope our institutions are *not* set back 20 years by a rejection of the 1963 Legislative tax program October 15. Instead, whether we like this tax or not, I ask, "Can we live with it for one biennium and plan now for whatever changes may be needed in January 1965?"

Please—study the possible consequences of the outcome of this election. I urge you to vote and to get your friends and neighbors to vote.

Your decision is vital to Oregon's two largest basic industries—forestry and agriculture. These industries—and Oregon—need strong, on-going programs of research and extension education if we are to meet the growing regional, national, and international competition we face in the years ahead.

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