

Oregon's Agricultural  
**Progress**  
Summer 1980



**Vitamin B6  
& exercise**

**Agricultural Experiment Station  
Oregon State University**



# comment

Director John R. Davis

## Don't destroy a good system

Farmers are easy to push around. In most cases, they aren't unionized and are forced to sell in markets beyond their control. But don't push too far, my friend, because you may destroy a system that works and drive the cost of food to levels so high you—or your children—will have to make a choice between maintaining a good, balanced diet or heating your house.

Today, we call having to make that kind of choice poverty.

But let's be more analytical about this: What are the real impacts of the American farmer's ever-increasing efficiency in producing low-cost food (the average American spends about 17 percent of take-home pay for a quality product unsurpassed anywhere)?

---

### America's good life

---

- High standard of living—Most Americans enjoy a life, a standard of living, unknown in other countries. Because the average person pays only about a sixth of take-home pay for food, he or she can attain the necessities of life and many of the amenities most people value and treasure so dearly.
- Good education—Our people probably are the best educated in the world. Education provokes strong leadership, new discoveries in science and a generally improved understanding among people. We can be thankful that we have the time and the resources to invest in education. It would not be so if we had to devote a higher portion of those resources to food.

- International balance of trade—Many American manufacturers have priced themselves out of international markets because of high labor costs. Not the American farmer. Low food costs, a result of efficient agricultural production, keep us in the international marketplace with agricultural products. It is fortunate we have had agriculture to assist in maintaining a reasonable balance of trade.

So what, you say. We've heard all these good words before. Agriculturalists constantly pat themselves on the back for all that has been accomplished, and most Americans have a good feeling for farmers and ranchers.

Here is what. It is obvious that political and regulatory pressures on agriculture are forcing changes that may not be in the best interests of our nation. These pressures have been ignored for the most part by urban populations—those that have the most to lose if the price of food is increased substantially.

Examples? The use of chemicals in food production and processing is under attack from many sources (some for legitimate reasons and others for personal or political reasons). Mechanization research is almost a thing of the past in California because of pressures from the United Farm Workers. Other costs are so high that getting into farming is almost impossible for young people.

What should be done?

Those of you not in agriculture should be concerned about factors that reduce the ability of the farmer

to produce food efficiently. Take away the farmer's technology and initiative and you'll increase food prices slowly. You probably won't see it in this generation. But you surely can expect that the next generation will pay the price.

Those of you in agriculture should communicate your issues more clearly to the public. Why should you shoulder the blame for . . . say . . . the failure of the small farm when the problem may be the cost-price squeeze or federal regulations.

Remember, the way to a person's heart is through the stomach. ■

# contents

Richard Floyd, Editor  
Experiment Station Communications

Dave King, Assistant Editor  
Experiment Station Communications

Andy Duncan, Editor  
Oregon's Agricultural Progress

Cover: Distance runners have surprisingly high vitamin B6 levels in their blood after a workout, nutrition researchers Lorraine Miller and Jim Leklem have found. See story, page 6. (Photo: Dave King.)

Vol. 27, No. 1. *Oregon's Agricultural Progress*, a quarterly research report, is published by the Oregon Agricultural Experiment Station, John R. Davis, Director, and sent free to Oregon residents. Address requests to Editor, AdS 416 R, Oregon State University, Corvallis, OR 97331, or see your County Extension Agent. Written material may be reprinted provided no endorsement of a commercial product is stated or implied. Please credit *Oregon's Agricultural Progress* and Oregon State University. To simplify technical terminology, trade names of products or equipment sometimes will be used. No endorsement of product names is intended nor is criticism implied of products not mentioned.



## Soil test . . . . . 4

A yearly check on nitrogen levels can pay off for wheat farmers in central Oregon.



## Vitamin B6 . . . . . 6

Running, oral contraceptives and dietary fiber are a few of the focal points in an OSU study of how you get the key vitamin from foods.



## Dining for dollars . . . . . 9

What is it like to eat for science?



## Up in smoke . . . . . 10

Instead of burning straw, maybe Oregonians can turn it into gold.

## Alcohol and Dr. Anderson 11

Alcohol is shaking up the professor's life.



## Work in progress . . . . . 13

Cottonseeds—Volcanic ash—Cattle feed—Hidden culprits—'Test tube' berries—Eagles

## Profile . . . . . 16

You can't take it with you. But agricultural estate planning expert Grant Blanch can help you leave it where you want.

# Soil test helps boost wheat yield



**N**itrogen fertilizer is not dirt cheap.

That is one reason spring wheat farmers in Central Oregon's high desert country should have a yearly soil test run to find out how much they need in their irrigated fields.

Another reason (the big payoff) is the tests are a giant stride toward getting consistently high yields and producing quality grain, researchers at OSU's Central Oregon Agricultural Experiment Station at Redmond have learned.

"By using a test, a grower can apply just enough nitrogen to bring the soil near the optimum level," said Steve James, an agronomy technician who along with Station Superintendent Malcolm Johnson is in the final stage of a four-year study of the best planting techniques and growing conditions for relatively new, high-yielding varieties of spring wheat popular in central Oregon.

"Adding too little or too much nitrogen can make quite a difference in yield and quality, we've found," James added.

According to the researchers, the optimum nitrogen level in central Oregon for newer spring wheat varieties, such as Fieldwin, Fielder, Springfield and Twin, appears to be about 150 to 200 pounds per acre when the wheat is planted on March 10—the date the researchers singled out as best.

James recalled a field trial that illustrated how soil testing helps.

In March 1976, he and Johnson found a nitrogen level (also called nitrate level) of 30 pounds per acre in a test field. They added 160 pounds of nitrogen per acre and harvested a good yield of about 90 bushels an acre. The next March, they applied half as much nitrogen—80 pounds per acre—and got a similar good yield, thanks to nitrogen accumulated in the soil from the previous year.

"If a person just blanketed 160 pounds per acre he would waste a lot of fertilizer (nitrogen fertilizer costs about 28 cents a pound)," said James. "Sometimes he might hit it just right and get good yields. At other times he might even reduce the yield."

How could nitrogen reduce the yield? Too much nitrogen seems to produce taller plants with broader leaves and smaller grain kernels, James said. The condition also increases the chances that plants will "lodge" or fall to one side (also caused by wind and rain).

One myth the researchers punctured with their study is how best to "salvage" a late planting.

James said some farmers think if they wait until late spring—April or May—to plant they can compensate by adding extra nitrogen.

"We found for each week you wait past March 10 you lose about two bushels of wheat per acre. The rate accelerates. The longer you wait, the more you lose," he said, noting that extra nitrogen simply fuels growth of the plants' vegetative parts—not the grain.

According to Johnson, head of the Central Oregon station since it opened in 1948, soil testing for nitrogen is nothing new—just overlooked.

"They started it over in the Columbia Basin 15 or 20 years ago and they've got it down to a fine art," he said, explaining that the organic matter and moisture in soils west of the Cascades make soil tests much less effective than in eastern and central Oregon, where some soil contains less than 2 percent organic matter.

"But I tell you," said Johnson, "as long as they've had soil tests some farmers haven't used them like they should. You can go out right now around here and find soils with no chance of a good crop (because of the nitrogen level)."

The researcher said tests for levels of nitrogen and other key substances—such as phosphorus and potassium—should be taken within two or three weeks of planting.

The tests can be arranged through county Extension offices and run for "probably less than \$10" through the OSU Soil Testing Laboratory on the campus in Corvallis or through commercial soil testing laboratories.

Next the Central Oregon researchers plan to turn their attention to winter wheat. But that is "another challenge," they said, because the wheat is planted in the fall, making erratic winter weather a formidable foe.

A freezing winter means nitrogen put in the soil before fall planting will stay there until the wheat bursts

forth in the spring. A warm winter means moisture probably will leach much of the nitrogen out before spring.

But a more accurate winter testing system is worth pursuing, the researchers believe.

James told of a spring wheat experiment in which 80 pounds of nitrogen resulted in a yield of 40 extra bushels of wheat per acre (worth about \$4 a bushel). The extra nitrogen cost slightly more than \$22 per acre.

Net profit: \$138.60 an acre (a nice payoff). ■



*Too much nitrogen in the soil, as well as too little, can cut wheat yields, says Steve James (left, foreground), shown examining wheat seeds planted in an experimental field behind OSU's research station at Redmond.*

# The body & B6



**T**he journeys start in many places: an avocado, a filet of salmon, a banana or a cut of lean meat. They end in many places, too: the churning legs of a distance runner, a new fold on a person's "spare tire" or a region of the brain sending messages to the vocal cords so thoughts will be expressed aloud.

The traveler is vitamin B6, an essential part of every person's diet. This is the story of what OSU researchers have learned following its trails through the human body.

The saga begins about five years ago when OSU foods and nutrition professors Lorraine Miller and Jim Leklem were participating in the early stages of a multistate research effort.

The purpose of the research was to determine the "bioavailability" of vitamins and minerals in various foods. Think of vitamin B6, beef and a banana, for example. Assume an equal portion of beef contains more B6 than the banana, but the banana delivers more to body tissue where it is needed. The banana's B6 is considered more "bioavailable."

In the multistate project, responsibility for studying a long list of vitamins and minerals was split among scientists from Oregon, California, Nevada, Hawaii, Colorado and Nebraska. Because of some pioneering vitamin B6 study by OSU

nutritionist Clara Storvick (by then retired), and the interests of OSU researchers, the Oregon scientists were asked to study vitamin B6.

Scientists already knew quite a bit about the vitamin. They knew the body uses it to convert substances into amino acids (building blocks of the protein we get from beef, nuts, fish and other foods), into energy and into fat, really a stored form of energy.

They also knew B6 helps convert one amino acid into niacin

---

## **Nutrition researchers Lorraine Miller and Jim Leklem are piling up information about the key vitamin.**

---

(another vitamin essential in metabolism) and the body's stored form of sugar, called glycogen, into the energy that powers muscles.

They suspected (still do) vitamin B6 helps create a brain substance that sends messages through the nervous system to various body parts (such as the vocal cords).

Miller and Leklem set off into new research territory. In early experiments they examined the

influence of various food components on the body's ability to use vitamin B6 and compared the amount and bioavailability of B6 in various proteins in most people's diets.

The research led to a chance discovery.

"Five students were participating in an experiment. Lorraine and I were providing them with all their meals—just as we have in most of our B6 experiments," Leklem explained.

"The graduate student working on the project found the levels of B6 went way up on one subject and asked him what he had eaten that wasn't in the special diet he was being fed. He professed innocence and maintained that he had not strayed from the diet. The only thing he had done differently was to go running just before a blood sample was taken."

The graduate researcher asked the other subjects to go for a run, then took blood samples from all four. The samples also contained higher-than-normal B6 levels.

Leklem was intrigued. He carried the investigation to Crescent Valley High School in Corvallis, where he studied the blood of track team runners. He also studied the blood of runners from the OSU cross country track team.



In each case, he found surprisingly high B6 levels after a run. Interpreting the significance was—and still is—a challenge. The researchers knew B6 helps convert stored sugar into energy. But the B6 blood level was much higher than they expected.

Nonscientists hearing of the work were tempted to search for practical implications. Was there a link between vitamin B6 and athletic performance? Would an even higher B6 level help a person run faster, or longer?

Leklem still is cautious.

"I wouldn't want any runners or other athletes to go out and load up on vitamin B6," he said. "We simply don't know enough about how it works. For instance, what if the B6 released all the available energy to the muscles too soon? The athlete would peak early and run out of steam before the end of competition."

In another study, Miller and Leklem decided to explore the relationship between vitamin B6 and oral contraceptives . . . if there is one. Researchers elsewhere had suggested birth control pills affect the body's ability to use vitamins and minerals.

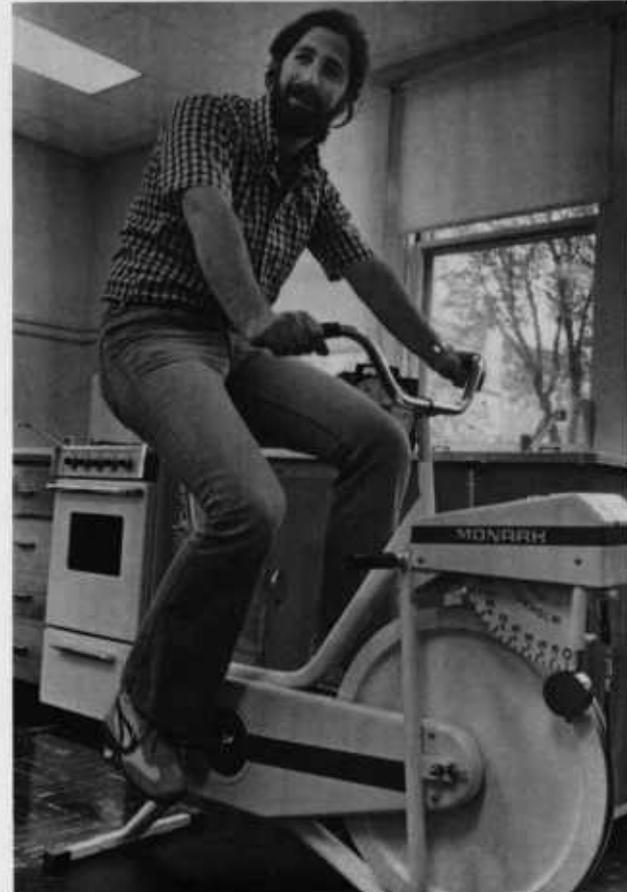
In the case of vitamin B6, they were right.

"We found oral contraceptive users have a lower vitamin B6 level in their blood," Miller said. "This means less of the vitamin is making the transition from food in the digestive tract to body tissues. Blood cells and the fluid surrounding them, called plasma, transport B6 to the tissues."

"We also noted from reports in the literature that pregnant women who have used the pill before pregnancy have a lower level of vitamin B6 in their blood during pregnancy," Leklem added. "We don't know exactly why the levels are lower. . . ."

Some women taking oral contraceptives suffer depression, he said, and there have been suggestions that lower vitamin B6 levels might be one cause. More research is needed in the area.

"Eating a well-balanced diet is probably the best way of alleviating



Lorraine Miller and Jim Leklem (standing, page 6) studied the relationship between exercise and vitamin B6 last spring. Birth control pills (lower right) reduce the body's ability to obtain the vitamin from foods, say the researchers.

any potential deficiencies," said the researcher. "And in cases like this with oral contraceptives where our work seems to indicate the pill itself may cut down on the body intake of vitamin B6, we suggest a slight increase in foods high in B6."

Such foods include avocados, salmon, lean beef, whole wheat, enriched bread, bananas and nuts, he said.

Miller's and Leklem's explorations have uncovered some information that is easily interpreted, and some that is not.

For instance, they found cooking reduces the bioavailability of vitamin B6 in most foods (roasting can "lock up" 50 to 70 percent of some B6). But the B6 in thoroughly cooked Army rations is about as bioavailable as that in most uncooked food. They hope to know why one day.

They have found a general relationship between the amount of protein a person eats and the vitamin B6 needed to break down the protein's amino acids: The more protein, the more B6 needed.

Also, Miller and Leklem suspect—they are making the assumption in some of their experiments, in fact—that fiber in the diet inhibits the body's ability to use vitamin B6.

The B6 in soybeans (which contain fiber) is less bioavailable than that in lean meat (which contains no fiber), they have found. And it appears whole wheat bread, containing fibrous bran, delivers less B6 to the bloodstream than less fibrous breads.

Leklem said the finding has prompted the U.S. Food and Drug Administration to begin re-evaluating its guidelines on vitamin supplement requirements for bread.

Where will the vitamin B6 research lead Miller and Leklem?

They plan to continue their broad-based approach, peeking into interesting areas here and there (such as the studies of the blood of runners and pregnant women), but with a major emphasis on studying the digestive process—learning why more vitamin B6 does not journey from the food we put in our bodies to the parts of the body that need it. ■



**breakfast**  
orange juice  
bread  
applesauce  
crispy rice  
milk (nonfat dried)

**lunch**  
cheddar cheese  
bread  
peaches (canned)  
carrots (raw)  
pickles (dill)  
milk (nonfat dried)

**dinner**  
ground beef  
green beans (canned)  
rice casserole  
pears (canned)  
milk (nonfat dried)  
bread  
ice cream  
cookies

## B6 volunteers

# Dining for dollars

"Somehow we're doing it again," said Ralph Frick, smiling as he pondered over his obligations as a student volunteer in a vitamin B6 diet study this spring.

Last year, he and his friend Bill Hisaw spent "50 days and 50 nights" eating a similar, bland diet in another B6 experiment also directed by OSU foods and nutrition professors Lorraine Miller and Jim Leklem.

Why did they do it? "Masochism." "You don't have to do dishes." "You don't have to cook."

Besides, added Ralph and Bill, they earned a little money, made new friends and got an inside look at a university research project.

The experiment Ralph, Bill and other students took part in last year compared the effects of beef- and

soybean-based diets on the volunteers' vitamin B6 levels. This spring, the research focus was the effect of exercise on B6 levels.

All Leklem's and Miller's vitamin studies with human volunteers include a strict dietary regimen that can drive a person to daydreams of "Big Macs" and milkshakes.

Ralph, 22 and a senior studying mechanical engineering, and Bill, a 25-year-old senior and animal science major, were among 10 volunteers last year and five this spring who met for meals in a small dining room in the OSU home economics building.

The volunteers were required to eat all the foods they were given, but were not allowed second helpings. For variety, they could apply small amounts of salt, pepper and condiments such as mustard.

Between-meal snacks were limited to "7-UP" (a soft drink), hard candy, coffee, tea and sugar.

When the food was gone, the volunteers rinsed their dishes, then drank the rinse water—required so graduate students could measure their exact food intake.

"Meals became very social," Bill recalled of his initial study. "There were a lot of jokes about the food. Toward the end, you didn't really talk about taste. You just kind of ate it."

Last year's regime lasted seven days a week for eight weeks; the volunteers earned \$3 a day.

In this spring's five-week experiment they had weekends off and got \$2.50 a day. The students collected their urine and gave periodic blood samples. Last year they collected their feces as well.

Other sacrifices: Drinking alcoholic beverages was prohibited last year. That "really cut into the social life," recalled Ralph. "We got desperate trying to figure out something to do. One night we drank a couple of pitchers of coffee at a coffee house."

Added Bill: "We only tried that once. I got home at 2 or 3 a.m. and spent the rest of the night staring at the walls."

But the final day of last year's study made up for a lot, the two agreed.

"They fixed us whatever we wanted," explained Ralph.

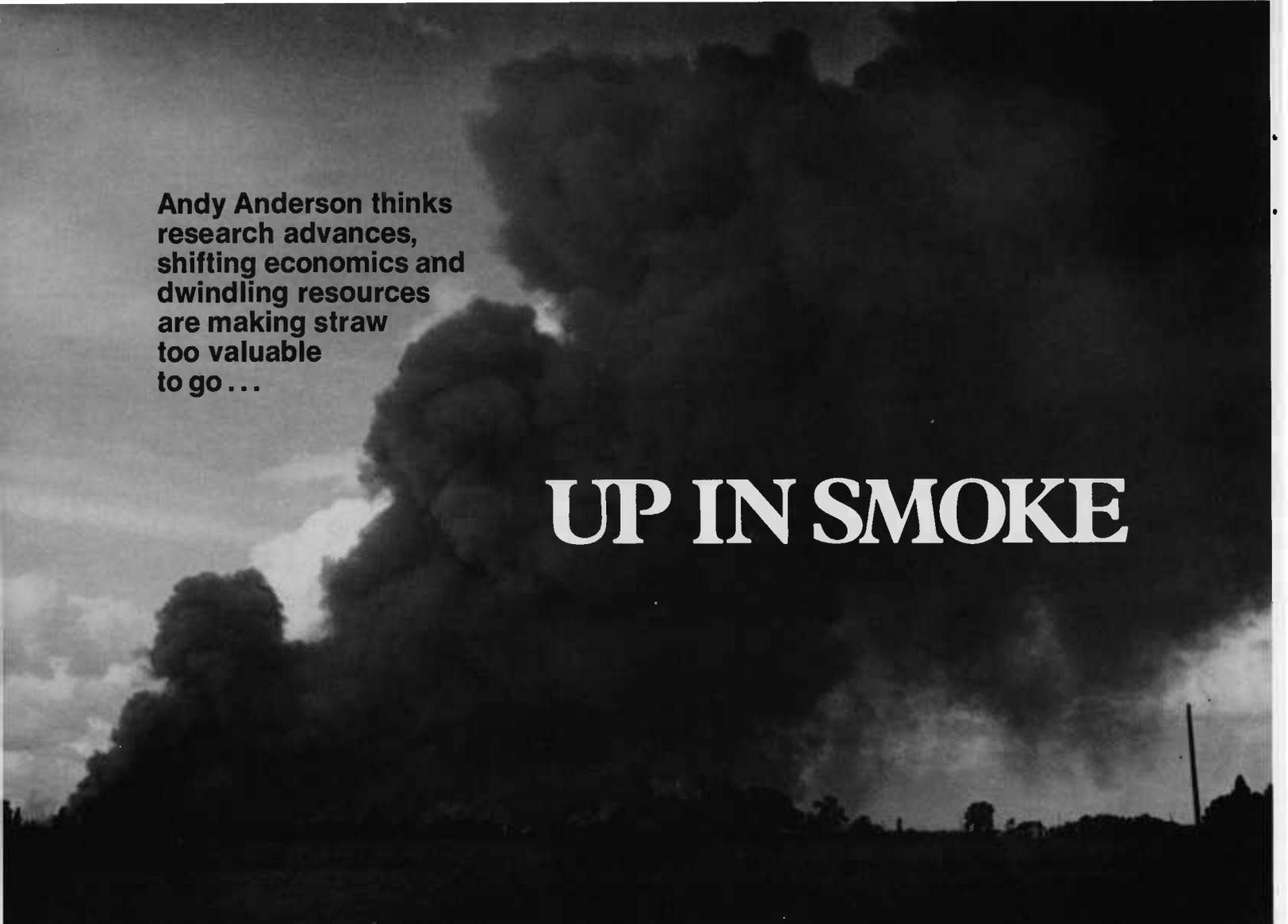
Ralph and Bill started the day at a certain doughnut shop they had walked past for 49 mornings while aromas of frying batter drifted out.

"We ate a bunch of great big tarts and doughnuts," Ralph said. "Then we went over to Milam (the home economics building) and had steak and eggs for breakfast."

They spent the evening with equal enthusiasm at a pizza and beer establishment. ■

*Two-time student volunteer Ralph Frick digs in at the vitamin B6 training table (top, page 8). Miller and Leklem monitored volunteers' food intake and weight closely.*





**Andy Anderson thinks research advances, shifting economics and dwindling resources are making straw too valuable to go . . .**

## UP IN SMOKE

**R**umpelstiltskin spun straw into gold. Andy Anderson says Oregonians can turn it into “liquid gold,” plus sweetener for your coffee and food for livestock (your family too, perhaps).

His story is not a fairytale.

What the OSU microbiologist envisions is a single production facility geared to convert the sugar and starch in mountainous piles of plant materials—such as straw and fruit and vegetable wastes—into alcohol fuel (“liquid gold”) and to obtain a substance (an enzyme) needed to make a popular natural sweetener called fructose. “Wastes” from the facility would be a high-protein food supplement for livestock, and possibly humans.

“I think a multiple-use plant in the Willamette Valley is the only way to go,” said Anderson, who for 12 years

has searched for new uses for the hundreds of tons of straw produced and burned each year by Oregon’s world-renowned grass seed industry.

“The same starting machinery (fermentation equipment) could be used for several of these processes,” he added. “Then you could go on and make alcohol and extract the enzyme and collect the feed supplement. Producing several products at the same plant would make the initial investment a lot more attractive. There are people sizing up the prospect right now.”

Anderson, who joined the OSU faculty in 1953 and is retiring this summer, was not always so optimistic.

“When we started to work with straw everything looked hopeless,” he said “I first fermented straw into alcohol eight or nine years ago . . . out of curiosity, mostly. Actually,

what we made was straw wine. It tasted terrible. Then we made mash for animal feed. People used to laugh and say the animals wouldn’t like the taste of that, either. They didn’t, at first.”

But no one is laughing these days.

“The science hasn’t changed all that much,” he said. “But now we’re looking at a new economy. The alcohol, of course, will go (producing alcohol fuel from plants). They’ll use almost anything they can get their hands on in Oregon because the state isn’t blessed with a lot of corn, barley and other grains.”

Alcohol fuel from fruit and vegetable wastes will make the first splash. But straw’s day will come, predicts Anderson.

He said the sugar and starch in straw are “tied up” in a substance called cellulose, making it more

difficult to obtain than that in fruits and vegetables. And straw is bulky and expensive to transport.

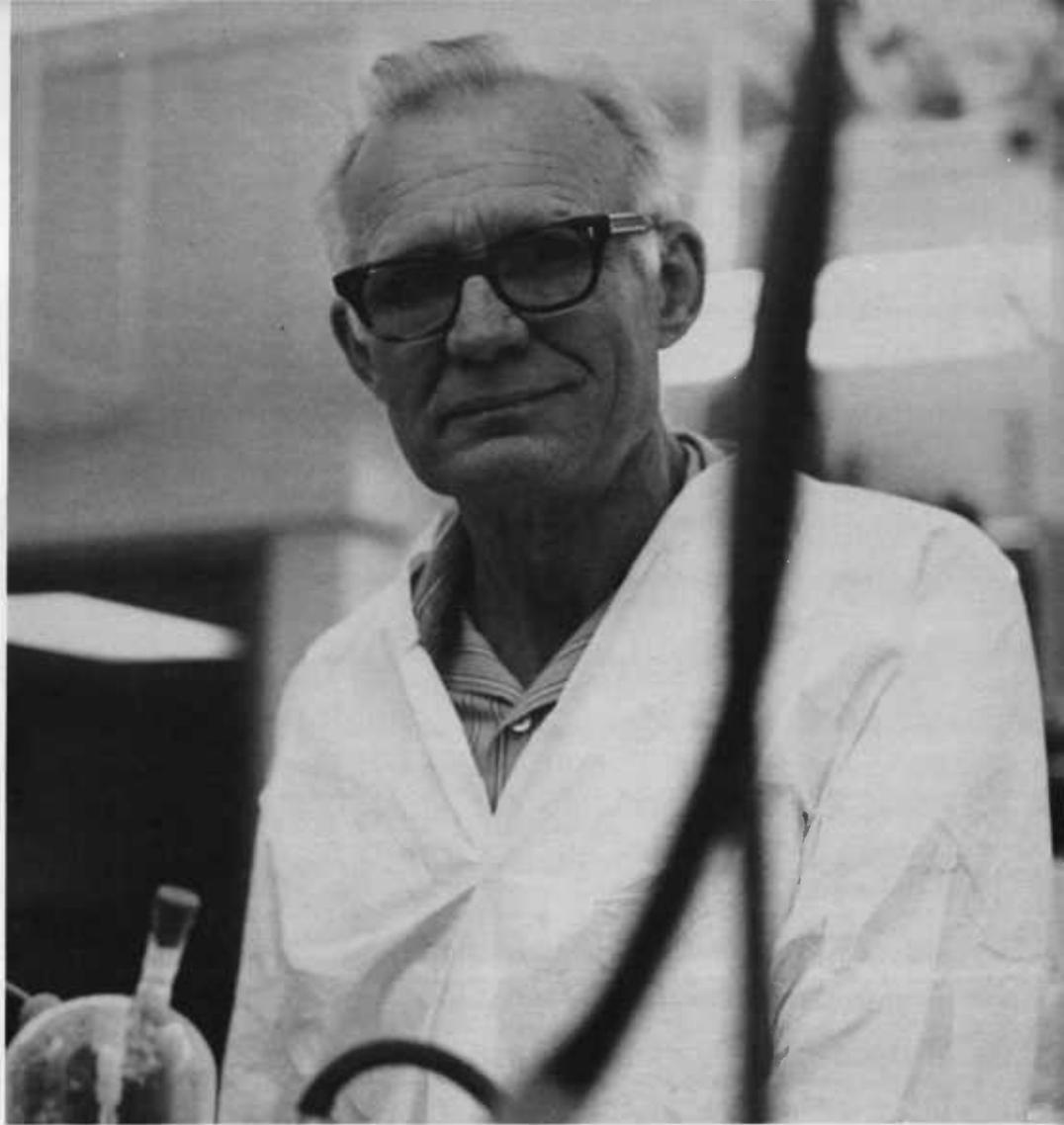
"But I anticipate that eventually, maybe in 10 years, straw will be as valuable as wood," he said. "You can make about 40 gallons of alcohol from a ton of straw. That means you could make at least 20 million gallons a year from Willamette Valley straw. Providing heat for the distilling process runs the price up. But we're working on that and I think you'll see a breakthrough."

Then there is fructose, a product invading America's grocery shelves.

Last fall, Anderson and research assistant Won Pen Chen announced they had discovered a way to use straw in the production of the low-calorie, natural sugar, which is twice as sweet as table sugar (it costs about half as much, too, because it is concentrated and shipping is less expensive).

Fructose, commonly made from corn at Midwest plants, can be made from the starch and sugar in straw (less efficiently). But Anderson and Chen took a different approach.

They used a newly isolated microorganism, a strain of streptomyces bacteria related to those that produce many antibiotic



*Microbiologist Andy Anderson*

## **How alcohol dizzied Dr. Anderson's life**

"All of a sudden, things are exploding," said Andy Anderson, a 65-year-old scientist in an unusual situation.

At an age when many people's professional careers are winding down (he is retiring this summer after 27 years at OSU), his telephone is ringing off the hook.

"I've got so many people calling me from all over the West Coast, and other places too, I can't keep up," he said.

The reason is alcohol.

The microbiologist has been studying how to make it from plants—ranging from grass straw to apples—for years, making him a bonafide expert at a time when shrinking oil supplies and skyrocketing prices have sent the entire nation on an alcohol fuel binge.

Week after week, Anderson is bombarded with requests from people who want to fly him in to speak at their conference, or visit him so he can look over their plans for an alcohol production facility. The dusty scientific papers (he wrote) in his office are in demand.

"Can I use fodder beets?" "Juniper berries?" "How can I heat the distillery cheaper?" The questions are endless.

He realizes he is caught in the same whirlwind as some of his colleagues at other universities.

"Industrial microbiology is hot property now," he said. "Suddenly it is much more lucrative than teaching. They may have trouble hiring teachers in the future."

As for himself, Anderson is retiring from university life only. He is a consultant to "three or four" alcohol production plants in Oregon and to a commercial firm evaluating the potential of growing mushrooms in straw, an agricultural product he has given special research attention for 12 years.

In addition, he said, people are visiting him "from all over the country" to inquire about a process he developed for obtaining from straw a substance needed to make a natural sweetener called fructose.

"It looks like I'll work until I'm about 150," he said, smiling as the telephone jingled. ■

drugs, to “harvest” an enzyme called glucose isomerase from straw.

The enzyme is an important, and thus expensive, ingredient in commercial fructose production. Firms now extract it from corn, which costs more than \$85 a ton. Willamette Valley straw costs about \$40 a ton.

“Straw is definitely a cheaper source of the enzyme, and at a multiple-use plant you might want to produce the enzyme for sale to Midwest firms and make some fructose yourself from straw and other materials,” said Anderson, reemphasizing that some of the same steps are needed to obtain glucose isomerase and to produce fructose and alcohol fuel (and that each of the processes boosts the protein content of the leftovers, making them valuable as a food supplement).

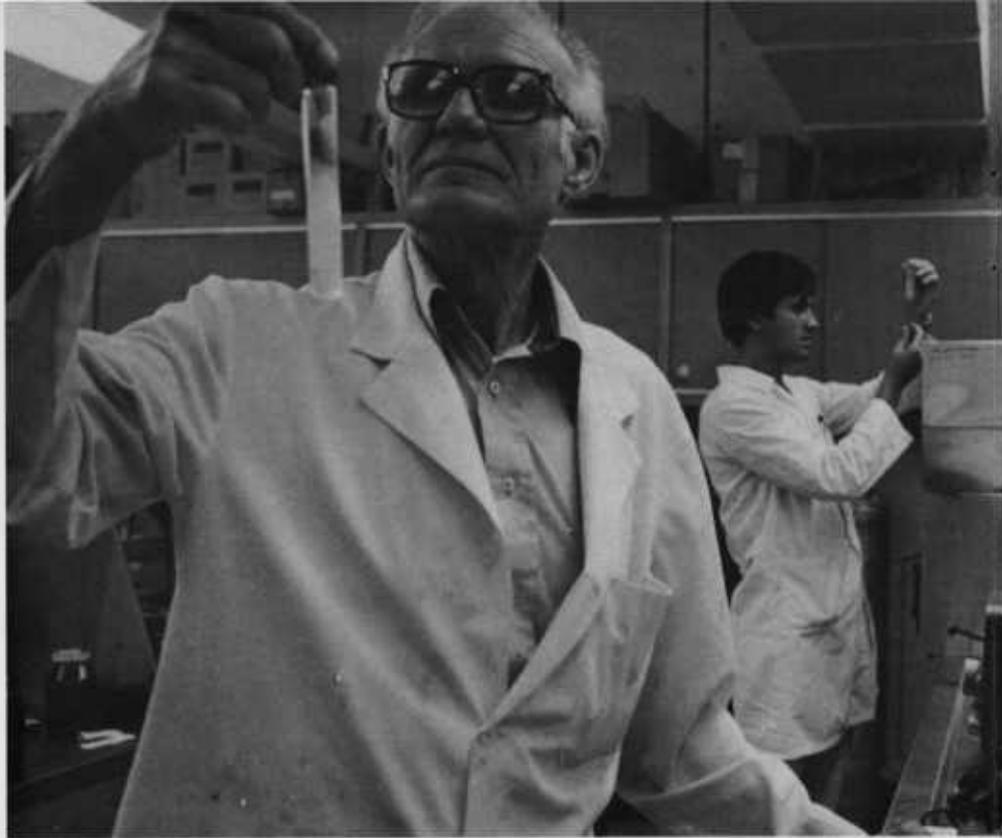
And if all that isn’t enough to boggle a grass seed grower who has spent years eyeing straw as a necessary byproduct of his toils, there is more.

Anderson has learned from some special work he did for the National Academy of Sciences, and a “little side experiment,” that straw—annual ryegrass straw in particular—is an excellent medium for growing several types of mushrooms popular in the Orient, and that the straw leftovers are . . . you guessed it . . . high in protein and a good animal food. Growing certain mushrooms in ground-up straw has good commercial potential, he believes.

Surprisingly, considering the challenge he faced 12 years ago, Anderson’s overall contribution to Oregon straw producers may be helping give them a tough, but welcomed, choice: Who will they let buy their straw?

Relatively soon there won’t be enough, he thinks. Producing glucose isomerase will use only a small percentage. But all the straw in Oregon will be a “drop in the bucket” in the production of alcohol fuel and fructose.

Anderson already has that sort of attitude. Driving through the Willamette Valley at grass seed field burning time, he doesn’t see straw going up in smoke—just a valuable resource going down the drain. ■



*Anderson (above in his laboratory) inspects a vial of glucose isomerase enzyme (used to make fructose, a natural sweetener) he extracted from straw.*

## Cottonseed snack linked to cancer

It's what happens in your liver, not in your mouth, that worries OSU food scientists studying glandless cottonseeds being sold as a new snack food.

The researchers have reported the seeds cause high rates of cancer in tests with fish.

"Although we can't say unequivocally that glandless cottonseed kernels cause cancer in mammals," said research leader Russell Sinnhuber, "our tests show a substantial amount of liver cancer in rainbow trout."

Sinnhuber said two tanks of fish were fed a diet containing 25 percent roasted, glandless cottonseed kernels. More than 70 percent of the fish in one tank and more than 75 percent in the other developed liver cancer. Fish fed rations without glandless cottonseeds developed no cancer.

In another experiment, rainbow trout fed a diet of 7½ percent cottonseed oil had a cancer rate of nearly 30 percent.

The scientist said the cancer may be the result of an interplay between substances called cyclopropene fatty acids and aflatoxin in the glandless cottonseeds and cottonseed oil.

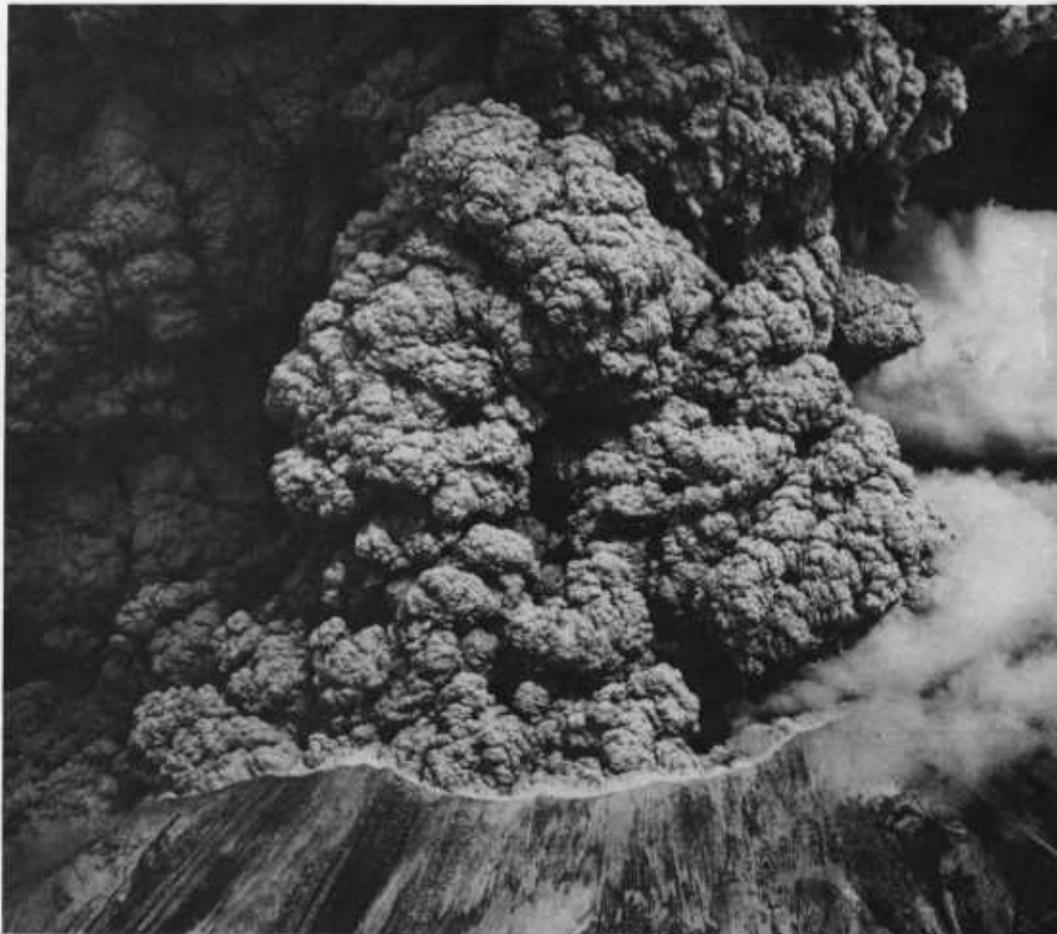
Cotton plants contain a toxic compound called gossypol, Sinnhuber said. That is why cottonseed meal has not been used in human food.

"But glandless cottonseed kernels, because of selective breeding, don't contain this substance," he said.

"This was thought to open the way for use of glandless cottonseed products as a protein supplement. But our work might change some thinking about that."

Roasted glandless cottonseed kernels are being promoted as a snack food in cotton-producing parts of the Southwest, he said. ■

Photo: Charles Rosenfeld



Mount St. Helens

## Ash: a 'whole different situation'

"I've been studying ash from volcanoes for 30 years. That's where a lot of Oregon soil came from. But this new stuff makes it a whole different situation," remarked one OSU soil scientist, echoing the sentiments of many colleagues.

He was referring, of course, to the reawakening of Washington's Mount St. Helens, the once-majestic, now threatening peak easily spotted from agricultural fields and orchards in several northwestern Oregon counties.

The volcano's eruptions have sent Experiment Station scientists in a broad range of disciplines scurrying to assess the impact of ash fallout and identify ways Oregonians can cope with it.

Working with Extension Service representatives and others on an agricultural task force (set up by School of Agriculture Dean Ernest Briskey), Station researchers are analyzing the ash's effect on farm crops, animals and machines and on fish, wildlife and people.

Research findings and tips for dealing with the ash are being published in "fact sheets" and distributed to the public through county Extension offices.

Citing the necessity of such study, one administrator—a geologist by training—recently predicted to an assembly of OSU scientists that Mount St. Helen's latest rumblings will be affecting the lives of Oregonians "long after those of us in this room are dead." ■

## Bugs for cattle

Let them eat bugs.  
That is what Dave Church is saying about cows.

The OSU animal scientist believes bacteria that feed on wastes from pulp and paper mills are a promising source of protein for beef cattle.

"As far as we know it's perfectly safe to feed, and test results indicate it's comparable to cottonseed meal (a popular protein supplement for cattle feed) in nutritional value," said Church.

The bacteria—called "single celled protein" by animal scientists—should cost less than cottonseed and other protein supplements such as soybeans and fishmeal, he added.

Church bases his opinions partially on findings of a recent OSU study. Cattle were fed dried, single cell protein from pulp mills in a diet similar to those used in commercial feedlots.



Cattle fed the waste supplement gained as much weight as those fed a cottonseed supplement. Evaluations after slaughter showed "no significant differences" in the flavor and overall desirability of steaks from the two groups of cattle.

"We think the pulp wastes have about 70 to 80 percent of the food value of cottonseed meal," said Church. "They have about the same protein content, and this and other studies suggest they're only slightly less digestible."

Church, who teamed up in the project with Walter Kennick, director

of the OSU Meat Science Laboratory, former graduate student Mark Asetline and Lois McGill, a food scientist, said he and the other researchers are planning another feeding study with more cattle than the 20 used initially.

He said potential production of dried single cell protein in the Northwest could amount to 300 tons a day.

"That's a lot of protein," said Church, adding that the economics of feeding the wastes to cattle needs more detailed inspection. ■



## The hidden culprits in the fats we eat

The fats we eat don't influence cancerous tumors, "fat culprits" do, report four OSU scientists who have put a new twist in debate over the various saturated and polyunsaturated fats in our diets.

Agricultural chemist Ian Tinsley, who teamed with researchers John

Schmitz, Philip Whanger and Donald Pierce to develop a new research approach intended to zero in on the individual fatty acids that make up fats, said the work "is a start" toward a new understanding of the role of fat in cancer.

"We really don't know what the implications of this might be yet," said Tinsley, "other than that it is clear you can't make general statements about how broad classes of fats, such as 'all saturated fats' or 'all polyunsaturated fats,' influence tumors.

"Rather than continuing to talk about which fats—saturated or polyunsaturated—might play a role in cancer, we have to get down to the specific fatty acids that are culprits."

In the past, Tinsley said, the public and scientists have tended to think in broad terms, linking saturated fats (such as butter) with heart disease and polyunsaturated fats (such as vegetable oils) with some forms of cancer.

Although studies have found a

connection between tumor incidence and polyunsaturated fats, the OSU researchers' aim is more specific.

In one study, they fed mice various combinations of 11 oils and fats formulated so statistical methods could be used to learn the effect of each fat component.

Among the findings were that one polyunsaturated fatty acid increased the incidence of tumors; another had no effect; one saturated fat inhibited tumors; three other saturated fats had no effect on tumors.

Tinsley said the research cannot be applied to the general population yet because of the complicated nature of the human body—some of the fatty acids play other essential roles in the body.

But he thinks the continuing study is headed in the right direction. Broad population studies have suggested the incidence of mammary (breast) tumors in humans can be linked to the level of dietary fats, he said, adding that moderate consumption of all fats probably is a good idea. ■

## Berry study spawns 'test tube babies'

Berry research is going down the tubes at OSU's North Willamette Agricultural Experiment Station at Aurora.

Test tubes.

The North Willamette staff is cooperating with USDA plant pathologists (stationed on the OSU campus) and scientists at Washington State University in a venture that includes growing tiny plantlets in test tubes. The plantlets are produced by taking minute pieces of tissue from mature plants.

Tissue culturing is the name of the process, which researchers say could usher in a new era in producing strawberries, raspberries, blackberries, Boysenberries and other Northwest small fruits and berries.

There are several advantages to starting plants like "test tube babies," then growing them to the field-ready stage in a greenhouse, as is being done at North Willamette, according to Lloyd Martin, station superintendent.

He said the technique prevents the spread of viral diseases common with other propagation techniques, including tipping berry canes into the ground in the field or growing rooted cuttings. Also, superior plants can be "cloned" rapidly, accelerating the selective breeding process.

"A grower can get a big jump on things if he begins by planting clean stock," said Martin.

He and research assistant Esther Nelson are conducting the North Willamette research. WSU scientist Andy Anderson is refining test tube culture methods and USDA plant pathologists Richard Converse, Joanna Pyott and others (at OSU) are screening plant materials for genetic and disease problems. ■

## Ecologist eyes eagle eyries

Eagles interest Bob Anthony.

The OSU wildlife ecologist is conducting three studies of the birds in Oregon, California and Washington.

"Actually, they're separate projects all intended to gather information that will help federal and state agencies manage an endangered species, the bald eagle," Anthony explained.

"In one project, we're trying to locate eagle nests in portions of Oregon and Washington, describe the type of forest stand the birds select for nesting and relate nesting success to nesting habitat.

"In another project we're studying the characteristics of night roosts and the roosting habits of about 500 birds that spend the winter in the Klamath Basin.

"And in another we're looking at the influence of movements and diet on the eagle's uptake of environmental contaminants."

Anthony said significant numbers of eagles are located in Oregon around large bodies of water in the high Cascades, in the Klamath Basin and on the lower Columbia River. He said it is too early in his 1½-year-old study to estimate the total population of bald eagles breeding or wintering in the state.

The researcher, assistant leader of the Oregon Cooperative Fish and Wildlife Unit based at OSU, said field studies in the project include locating nests from an airplane or other high vantage point and hiking in to take measurements in the surrounding forest, plus dawn and evening observations of communal roosts to determine the number and age of eagles entering and leaving.

There are only "a few thousand" bald eagles in the lower 48 United States, he said. Most are in Florida, the Pacific Northwest, the Great Lakes region and around Chesapeake Bay. ■





## An economist on the move

Agricultural economist Grant Blanch, who will retire from OSU and the Experiment Station in August after 35 years' service, says he plans to "rediscover fishing, golf, music, photography, reading and travel."

Travel? Some figured he had gotten his fill.

You see, during breaks in his teaching the last 12 years, Blanch has darted from one corner of Oregon to another conducting seminars on a topic he believes the public is more ignorant of than "almost any you could pick"—estate planning.

He's worked hard to correct the deficiency.

Many people don't know, for instance, about the exclusions in tax law that allow gifts of money and property.

But Blanch has delivered his message to thousands of country and city dwellers in three-fourths of Oregon's counties: "It's important to

make as much tax-free transfer as possible while you're alive to reduce estate and inheritance taxes."

He has delivered to his audiences countless other important but little known bits of information. Many were directed to farmers and ranchers, and there is a good reason for that. The seminars themselves are an outgrowth of an Experiment Station publication Blanch and a graduate student wrote almost two decades ago.

The pamphlet, called "The Farm-Ranch Corporation as a Tool for Financial Planning and Management," dealt with how a family corporation could be used in estate planning.

"People asked me for information," Blanch recalls, and later an Extension agent invited him to speak in Pendleton on the topic. "Then it just kind of grew. The word got out," he says.

Although laws related to estate planning are the same for all people, those in agriculture have some special problems, Blanch says, and solutions to those have been the seminars' key to success.

Example: "There usually isn't any surplus cash in a farm operation, and you don't want to fragment the business by giving one child, say, five acres and another five acres," explains Blanch.

But corporate securities can be bought, sold and traded, he adds. That means by incorporating the business a farmer can give his or her children shares without having to give up any working assets or control.

"As long as mother and dad still own 51 percent of the voting shares," he says, the tactic works. "Division of ownership is greatly simplified. It's a means of dividing the indivisible."

How will retirement-minded farmers and others cope when Blanch closes up his road show?

He may still be there to help. OSU officials have inquired about Blanch continuing to give the seminars when he retires from full-time duty. That means he may have to reconsider how much travel he wants to rediscover. ■



Third Class  
BULK RATE

POSTAGE PAID  
U.S. DEPARTMENT OF  
AGRICULTURE  
AGR 101

Director  
Agricultural Experiment Station  
Oregon State University  
Corvallis, OR 97331

Publication  
Penalty for Private Use  
\$300