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# PROFILE



Oregon



Agricultural  
Experiment  
Station

Oregon State University, Corvallis, Oregon, September 1978





# Toward a second century

Crops or condominiums?

That may be the fastest growing issue as agricultural experiment stations across the United States move into their second century.

How will Oregon cope with the anticipated growth of the next quarter century? One estimate has 2.5 million persons living in the Willamette Valley by the year 2000—almost double the number of persons living in the state's most productive agricultural area now. Galloping growth threatens to transform other areas of the state almost as fast.

Where will we find the resources to feed, clothe and house the next generation of Oregonians?

How drastically will the quality of life alter to accommodate the projected population?

Can we still have a relatively clean and attractive environment?

What about the fish and wildlife who also call this state their home?

The future of Oregon is a vital concern to everyone at the Oregon Agricultural Experiment Station, in the business of improving the state's renewable agricultural resources since 1888.

The Oregon Agricultural Experiment Station, the research arm of the School of Agriculture at Oregon State University, has more than 200 scientists conducting research in 16 departments on campus and nine branch stations located in varying climate and soil zones around

the state. Many Station researchers are also teachers, training the students of today to be the scientists of tomorrow.

#### Who supports the research?

More than half the Experiment Station's funding comes from the state's general fund. Gifts and grants are the next largest source of funds, accounting for nearly 20 percent of the budget. Remaining funds come from the federal government, much of it through grant programs, and from the sale of products and service fees.

#### What does the agricultural investment buy?

Lower food prices, higher quality clothing, energy and labor saving tools, healthy plants and more productive animals.

It is an investment well placed. An independent review team looking at the Experiment Station's programs a few years ago found that the average Oregon consumer annually invests about three dollars in agricultural research. For that investment, the consumer receives at least a \$200 benefit per year in keeping down his food bill.

Let's look at just one example of how Oregon has benefited from agricultural research. In the early 1970s, two new wheat varieties—Yamhill and Hyslop—were developed by Experiment Station researchers. The new varieties increased yields of the same basic renewable resources by 10 to 50 per cent in the first three years, adding about 20 million dollars annually to the state's economy.



And that's just one facet of Oregon's diverse agricultural picture.

Unlike other parts of the country where the agricultural emphasis centers on a few key farm products, Oregon has more than 35 major farm commodities, each with its own unique problems.

**How do scientists keep up with all the latest problems ?**

Experiment Station administrators work with the Agricultural Research and Advisory Council, which represents nearly all the state's farm commodity groups, to set priorities. Periodic surveys of agricultural groups and good communication links with the

Cooperative Extension Service, one of three divisions of the School of Agriculture, and the U.S. Department of Agriculture also keep scientists informed of the latest developments whether the concerns affect agricultural production, processing and marketing, conservation or management of the state's natural resources or human nutrition and well-being.

Researchers for the Oregon Agricultural Experiment Station are probing many parts of the world for solutions to pressing needs of Oregon for both today and the future. Their quest for knowledge is endless, because as old problems are solved, new ones arise.

**Can we exploit the resources of the sea to an even greater extent and still preserve its carefully balanced ecology?**

**Can we grow closer together and derive a greater yield from each acre?**

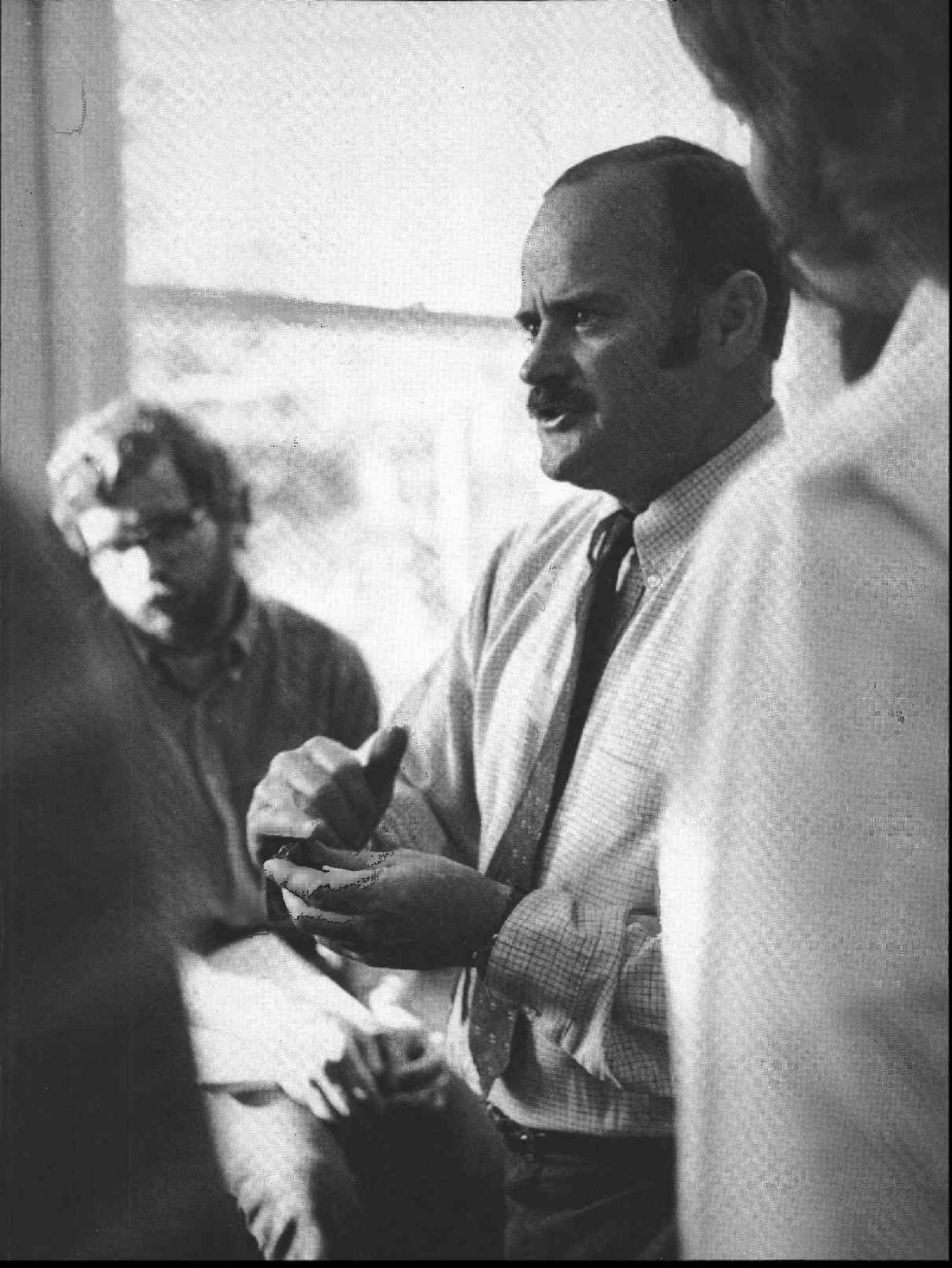
**Can we change the waste products of farm animals in feed lots and enclosed pens into a valuable energy resource?**

Scientists are answering these and many other questions right now through the research programs of the Oregon Agricultural Experiment Station. Combined with education and planning, research can mean the difference between a hungry world today and self-sufficient societies of the future.

In a world where the human population is growing faster than ever, agricultural research will make a big difference.









# Agricultural Chemistry

Chemicals—friends or foes?

In recent years, public discussions of chemical use in agriculture often resulted in heated debates leaving persons with the impressions that chemicals can be divided into two categories—those which are injurious to humans and those which are non-injurious.

OSU agricultural chemists believe the discussion is far more complicated than that. Man himself can be looked at as a chemical machine. Within his body, an enormous number of chemical reactions release energy, maintain bodily functions, transform nutrients and store excess compounds. Temperature and the presence of other chemicals are just two factors which can determine the reactions that go on in the human body.

Experiment Station research in the field of agricultural chemistry is designed to provide information on chemical and biochemical problems related to agriculture. By investigating chemicals for use in pest and weed control, or as regulating factors in plants and animals, scientists try to solve the problems which limit production potential while also

maintaining concern for the environment and the general welfare.

Often their work takes the researchers out into the field to provide consultation and assistance on chemical problems. But while dealing with the problems of the present, the scientists are also anticipating the problems which may arise in the future and carrying out research toward the solution of those problems, whether they pertain to plant, animal or human life.

Greater awareness of chemical potential for both good and harm are needed because in a demanding world, chemicals will continue to play an important part in assuring uninterrupted food production.

# Agricultural and Resource Economics

How much? How many? What's the impact? Who's affected?

Whether the subject is frost damage in Jackson County orchards, rangeland improvements near Vale, new methods of meat processing for grocery stores or the state system of workmen's compensation, Agricultural Experiment Station researchers in the Department of Agricultural and Resource Economics are expanding economic intelligence and finding answers to questions which affect Oregon's economy and people.

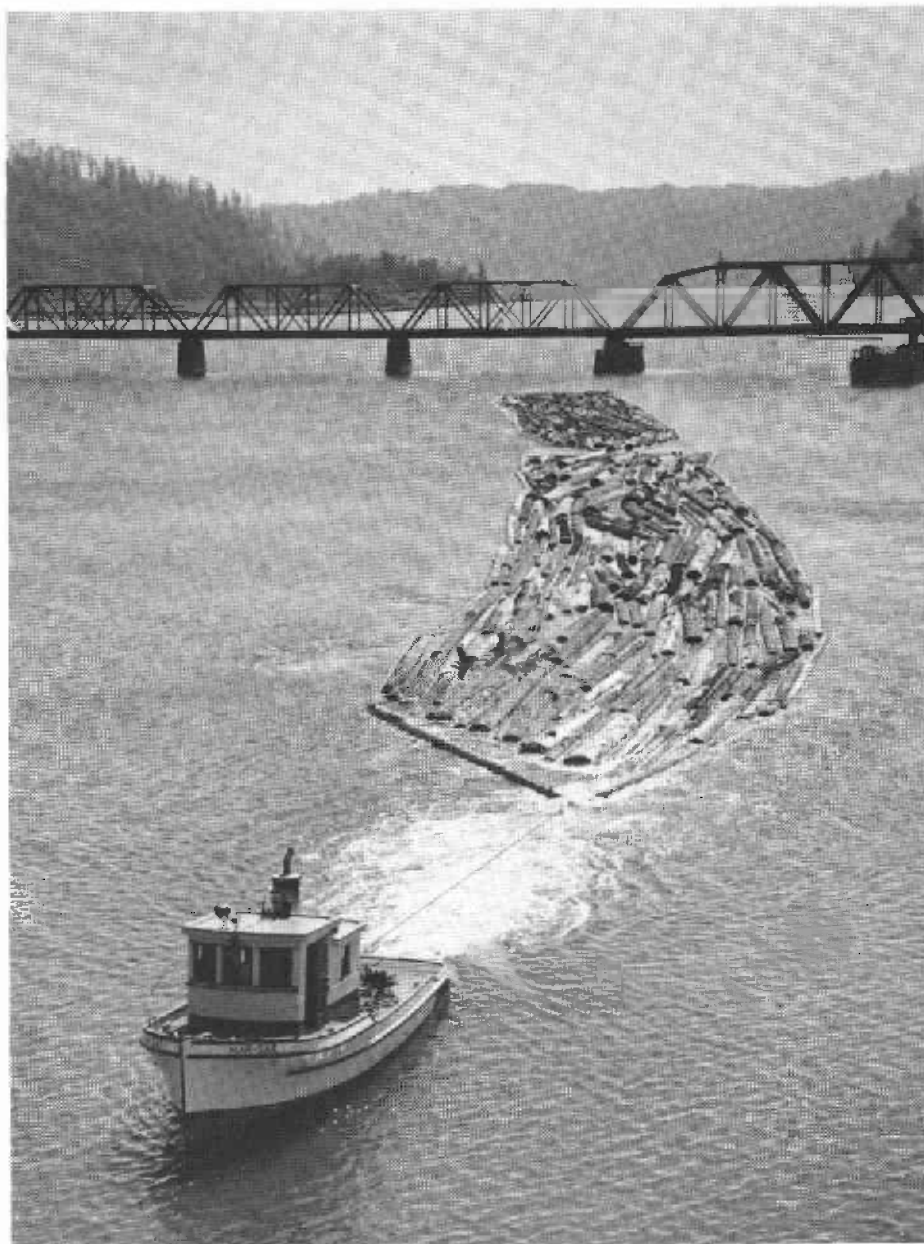
The basic research mission is simple. It is, "to sustain and improve, directly or indirectly, the economic well-being and quality of life of the citizens of the state of Oregon."

But the problems are difficult and take on the complex and diverse economic relationships of farmers, ranchers, nurserymen, cooperatives, processors, distributors, retailers, decision-makers, consumers, community governments and private citizens.

Emphasis is given to the efficiency of production, processing and distribution of food and fiber products for consumption. In addition, energy and resources are devoted to the broader issues of the economic development of communities, to health and social service needs and to the evaluation of the delivery systems to meet those needs. Ways to improve the efficiency and utilization of management and conservation of natural resources by individuals and public agencies for the benefit of Oregonians today and tomorrow are studied. Law makers are assisted by unbiased evaluations of public policy proposals and possible consequences as they pertain to resources, the environment and the residents of the state.

The award-winning department is constantly involved in the significant economic questions of the day, and the results are quickly analyzed so the public may benefit from the research.

Who gains? Everyone.





# Agricultural Engineering

Keeping agriculture on the move. That's what Experiment Station researchers in the Department of Agricultural Engineering are doing by developing new concepts and technologies to help Oregon farmers utilize their resources to the fullest.

Like water resources for farming purposes.

Research engineers have been cooperatively engaged in a long-term study of drainage patterns on the floor



of the Willamette Valley where soggy soil conditions have limited the crops that can be grown. By developing a new system of low-cost drainage which takes away excess moisture, land can be cultivated earlier in the year, extending the growing season and making it possible to grow a wider range of higher value crops.

But excess water is not the problem in all areas of the state. To help farmers who must budget water carefully, agricultural engineers are investigating drip irrigation systems with a multi-discipline program involving soil scientists, horticulturists and engineers. First developed in Israel, drip irrigation employs perforated plastic hoses and special watering plugs which distribute a limited amount of water to a precisely defined area. Soil erosion is decreased, less water is used and less labor is required than with conventional, sprinkler-type irrigation systems.

Improved efficiency is also a major concern.

Cutting labor costs is an important consideration in developing new harvesting and processing equipment. Being tested are machines which mechanically harvest strawberries, cherries and some ornamental crops, an experimental combine, an advanced seed sorter for reducing seed losses and a new system for improving the storage and quality of potatoes and onions.

But perhaps some of the most important research that Experiment Station engineers are cooperatively involved with is helping design the farm of the future, a system which will utilize all farm resources including the waste products of animals which are converted into energy-producing methane gas, algae beds for protein growth, and dry manure for feed or bedding.

Workshops, field days, publications and other media keep Oregonians informed about the findings of Experiment Station engineers, and when the people of the state need help, they turn to OSU for advice. One example of this mutual cooperation was the development of a mobile field sanitizer to decrease air pollution caused by open burning of grass seed fields. Several types of sanitizers have been developed and tested, and the technology of today will hopefully provide a basis for the political decisions of tomorrow.

Keeping Oregon on the move . . . the job of agricultural engineering at OSU.









# Agronomic Crop Science

Needed: More food for a hungry world.

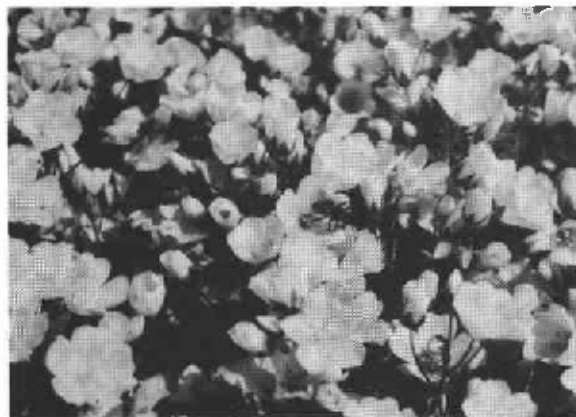
What can Oregon do to help solve the world's hunger problem? Many farmers in the state are growing field crops like wheat and other grains, forage, seed crops, potatoes, hops and oilseed crops to help feed humans directly through products like bread and indirectly from the meat and milk produced by animals.

Agronomy, or field crops, is one of Oregon's biggest agricultural businesses, putting more than \$450 million into the state's economy each year. Experiment Station researchers in the OSU Department of Agronomic Crop Science are trying to keep crop production levels high both in Oregon and elsewhere by developing new, more productive varieties.

Plant breeding, genetics, cytogenetics, crop physiology, improving cultural practices and crop production management methods to meet current technological advances mean more can be grown while maintaining environmental quality and conserving natural resources.

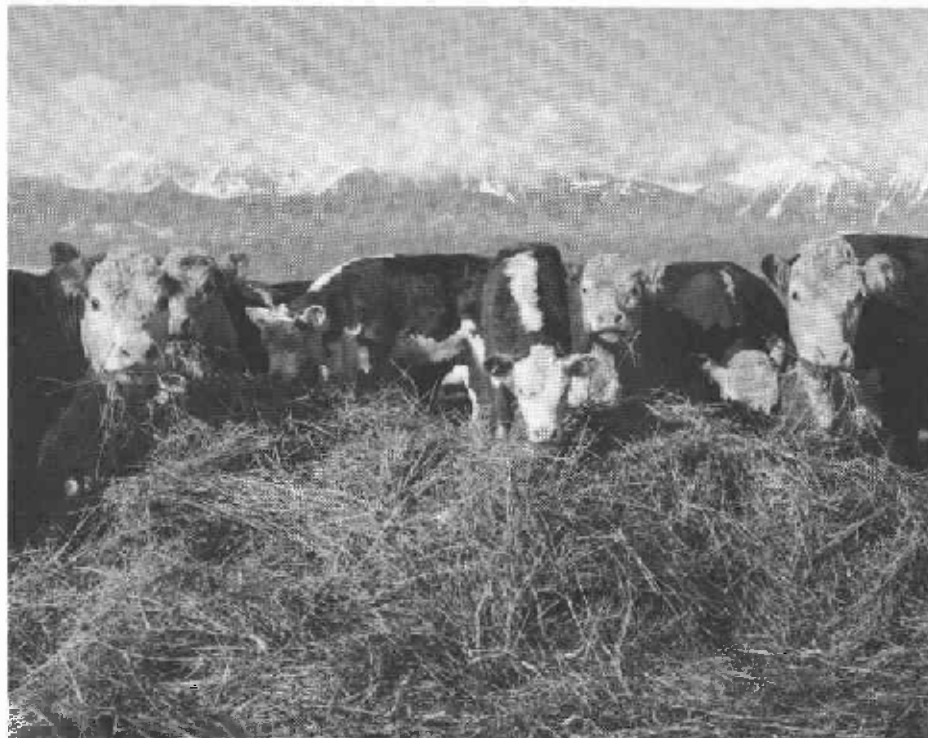
But plant research isn't simple. New crops are continually invaded by weeds, diseases and insects which limit the productivity of the new varieties and cultural practices. Scientists must constantly work on new varieties for the future, trying to outrun the problems before they limit maximum productivity.

Oregon State University is an international leader in the battle against world hunger. By participating in the cooperative programs of the Agency for International Development and the Rockefeller Foundation, Experiment Station scientists have been attacking the problems in other countries as well as at home, trying to develop new crops and practices. By so doing, they have helped to place the Oregon farmer and livestock producer in the most competitive position possible in the international as well as the national marketplace.





# Animal Science



Efficiency—that's the key word in animal production.

Efficient production of domesticated animals such as dairy and beef cattle, sheep and swine can assure man of a suitable food and fiber supply, even while populations increase. But more efficient animal production means more research.

Experiment Station researchers in the OSU Department of Animal Science are improving animal production efficiency with long term studies geared to generate new information about animals and short term projects which put that new information to work.

In identifying research projects, increased attention is being paid to the interrelationship of animal industries with non-agriculturally oriented persons on such matters as environmental protection and consumer concerns.

For instance, investigations of Oregon's rangelands are an important new area for animal science study. Forty-five of the 64 million acres in Oregon are rangelands, including 43 million acres in eastern Oregon and two million acres in western Oregon. Seventy-five per cent of the rangelands need improvement to meet their productive potential, and by expanding information, knowledge and understanding of rangeland resources, the areas can be utilized rationally.

An increased emphasis on non-competitive livestock feeding is also a major concern to the animal scientist. By using food supplies which cannot directly supply the nutritional needs of humans, animals can produce food and fiber for man in an indirect way. Grass straw, barnyard wastes and domestic sewage sludge are all possibilities being investigated by Station scientists.

Improving reproduction is yet another way of increasing animal production efficiency. By devising new ways to fool Mother Nature, man can "level out" animal production, breaking the traditional cycles of surplus and scarcity.

Animal production is an important part of Oregon's economy, providing a meaningful life and income for thousands of Oregonians both on and off farm. And through developing better livestock, new feeds and increasing the understanding of animals, the environment and society, animal production can be assured for both today and tomorrow.





# Botany and Plant Pathology

Keeping millions of acres of plants healthy is a full time job for researchers in the OSU Department of Botany and Plant Pathology.

The job is filled with challenges, because some diseases plaguing Oregon's plant life move slowly while others sprint from an infected area of a field, to the entire field and on to other fields as quickly as the wind blows.

Investigations of natural and man-assisted spread of diseases are conducted by OSU scientists on forest trees, wheat, small fruits, tree fruits and nuts, ornamental crops, vegetable crops and potatoes. Sometimes a disease must be traced back to its origins in order to learn how to control it, but in other cases preventative medicine can be practiced on the plants and diseases can be avoided or limited to non-economic levels with minimal usage of pesticides.

Basic plant functions like photosynthesis and nitrogen fixation are also investigated by OSU scientists who realize that increased populations in

Oregon and elsewhere mean we must know more about how to renew plant growth and reproduction again and again so there will always be enough plants for food and fiber, clothing and shelter.

Otherwise, we'll all be left out in the cold.



# Entomology

Insects—the world's most plentiful creatures—can help man's progress or hinder it, depending on the species involved.

Discovering how Oregon's many species of insects and related invertebrates such as mites and ticks affect the health and general welfare of plants, animals and man is the research mission of Experiment Station scientists in the Department of Entomology.

Some insects help man by pollinating crops, acting as natural enemies of weeds and serving as parasites and predators of pest insects. Others destroy crops and endanger the lives of livestock, wildlife and even humans.

Experiment Station entomologists try to manage the pest population as effectively as possible by finding and testing effective and environmentally acceptable chemical insecticides, adjusting cultural practices and taking advantage of behavioral traits of pests to suppress populations.

But problems come along because the hearty insects develop resistance to pesticides or adapt to new horticultural crop varieties, making it necessary for scientists to investigate the same insect again or develop totally new means of managing such pests as the bark beetle, pear psylla, alfalfa weevil and cherry fruit fly.

Understanding the population dynamics of the pests is another big job. By studying taxonomy, the scientists provide knowledge needed for diagnosing crop damage and charting pest population fluctuations. Geographic, host and seasonal distribution of both injurious and beneficial species are included in the taxonomy studies. One especially interesting study involves a survey of insects living in Oregon streams, finding how they are affected by logging practices, insecticide use, stream pollution or other man-generated changes.

Understanding and managing populations of the world's most abundant creatures is a challenge the entomologist is trying to meet.

