

Oregon's wild creatures: blessings or burdens?

These diverse populations of mammals, birds and fishes provide livelihood, recreation and esthetic enjoyment for the people of the state. But wild creatures can destroy food crops or spread disease among domesticated and other wild creatures.

More knowledge is needed about the wild creatures who also call Oregon home, and Agricultural Experiment Station scientists in the OSU Department of Fisheries and Wildlife are conducting basic research to help solve the problems related to the management of wild populations.

The factors related to fisheries and wildlife research ask three basic questions.

What can man do to help insure the survival of wild species? Experiment Station scientists have studied the needs of some mammals, birds and fishes and developed ways of dealing with the creatures to insure their continued survival. Some populations like oysters and salmon have grown under improved aquaculture techniques developed by Station researchers.

How can man keep wild species from destroying things which are necessary for his survival? Coyote damage to livestock, crop damage caused by a population explosion of ground squirrels, diseases spread from wild creatures to domesticated creatures and even to man present threats to man's survival. Experiment Station research is vital in developing new ways to handle the problems created by wild creatures.

What is man's impact on the populations of wildlife and fishes? Studies of the effects of industrial wastes on biological systems and the impact of recreation on Oregon's lakes are helping man develop more awareness of the needs of wild creatures.

With the new knowledge generated by research, wild creatures will continue to be a blessing to Oregon and live in harmony with man.

Fisheries and Wildlife





Food Science and Technology

Tasty foods take the efforts of many. Shipping, storage, canning, freezing, dehydrating, fermenting or fabricating of foods is the largest industry in the world, requiring the information and skills of millions of Americans.

Experiment Station scientists in the Department of Food Science and Technology apply science and engineering technology to the manufacture, preservation, storage, transportation and consumer use of food products. They realize that by understanding the chemical, physical and biological properties of foods and the effects of additives and processing on color, taste, texture, nutrients and toxicants in food, the consumer can purchase safe and nutritious foods for one of the smallest percentages of income found anywhere in the world.

Oregon's wide variety of foods from both land and sea provide a rich basis of research material. OSU scientists develop foods in laboratories in Corvallis and Astoria, constantly try to improve the quality and safety of foods which are available.

Environmental concerns also are being developed into laws governing the disposal of wastes from food processing plants and manufacturers are turning to Experiment Station researchers for help. Whey from cheese and dairy processing is finding new uses and natural sugars from many food products are being used instead of refined sugar additives because of work by Station researchers.

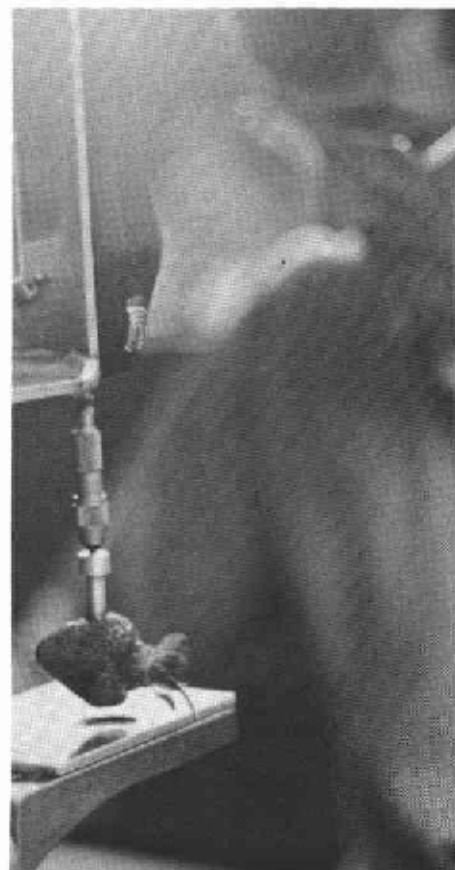
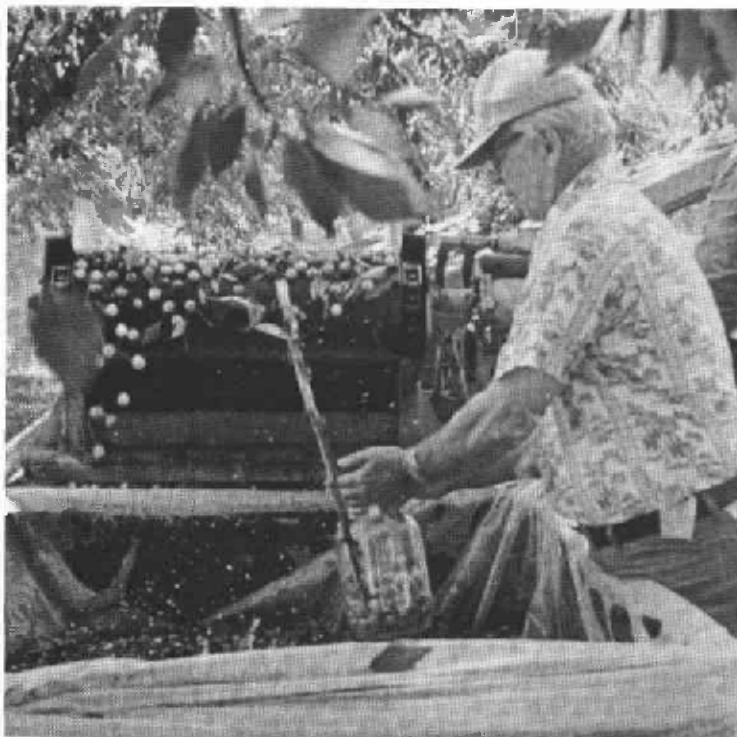
Taste tests, too, help determine product acceptability, in the market place and tests of shelf-life and food value all help provide the consumer with better food products.

Scientists in the Department of Food Science and Technology are also cooperators on research projects outside the department.

Mechanically harvested fruits such as strawberries and cherries have been evaluated by food scientists to make sure product value and quality have been maintained, and as other technological advances are made, this cooperation will continue.

Quality and value—two items high in the minds of consumers—receive special consideration by OSU food scientists. Products are evaluated with industry personnel, sometimes enthusiastically accepted and other times rejected because of cost, labor, supply or desirability.

Food science research is important—to consumers, to manufacturers, to farmers, in short, to everyone who eats.





Home Economics

Value—that's what Oregon consumers expect when they spend their dollars.

Home economists protect the consumers' interests when they research subjects ranging from vitamin levels in vegetables to stain resistance in fabric finishes.

Researchers in home economics are determining the nutritional requirements of humans and the current nutritional status of the young and the elderly, focusing on questions which will improve health and ultimately help alleviate hunger and malnutrition among persons of all ages and all socio-economic classes.

Information about food quality is also an important research consideration. By understanding the nutrient levels in foods and determining levels of food poisoning toxins which can occur in foods, the researchers can inform consumers about how to select, prepare, serve and store foods for maximum nutritional value and safety.

Value is a big consideration when the consumer purchases clothing and

home furnishings, too. Experiment Station researchers help consumers by investigating wrinkle-resistance, colorfastness and soil release properties of fabrics used for clothings and home furnishings, and publishing the research results.

The value of human resources is important, too. Home economics research is expanding its focus to include other contemporary human problems of families and households—problems made more complex by the economic, energy and social crisis.

Home economists seek to improve the general welfare and well being of all Oregonians—young, old, rich and poor from all cultural and ethnic heritages.





Horticulture

Helping Oregon solve its growing problems—that's the aim of Experiment Station research in the OSU Department of Horticulture.

Researchers are testing new growing methods like high density plantings of apples, filberts, pears, bush beans and sweet corn and gaining substantial improvements in yields per acre. In Golden Delicious apples alone, Station researchers found the value of the crop on a 1,000 acre planting with densely planted six-year-old trees could exceed that of the entire 8,000 acres of existing conventional apple orchards.

And as high density planting becomes an ever-present reality, new methods of harvesting the fruit become more important.

Mechanical harvesting of cherries, caneberries and strawberries are already commercial realities thanks to cooperative research at OSU.

And as high density planting becomes an ever-present reality, new methods of harvesting the fruit become more important. The mechanical harvest of cherries and caneberries are already commercial realities, and the harvest of strawberries by machine appears near at hand thanks to cooperative research at OSU. New varieties developed by station scientists and USDA-ARS personnel have helped preserve some industries that were becoming vulnerable because of labor shortages, rising costs and increased competition. One success story is the caneberry industry. The industry was fading a few years ago due to competition and high labor costs, but with new varieties developed by OSU horticulturists and mechanical harvesting equipment built by agricultural engineers, the industry is growing again with an estimated value of more than \$12 million before processing.

While some older Oregon industries have kept up with the times because of horticultural research, new industries have grown with the help of Station research, too. Disease-free planting stocks have helped the state's infant grape industry, and more than 1,000 acres of wine grapes are now on the way to production.

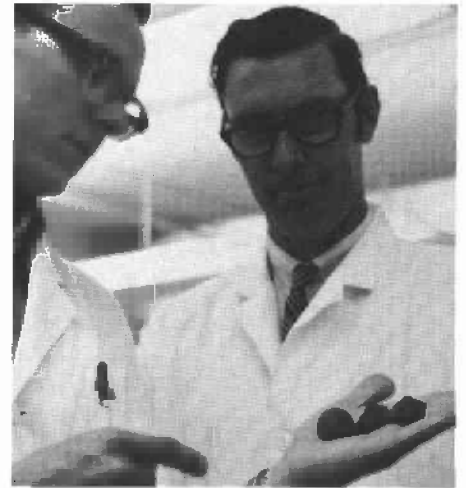
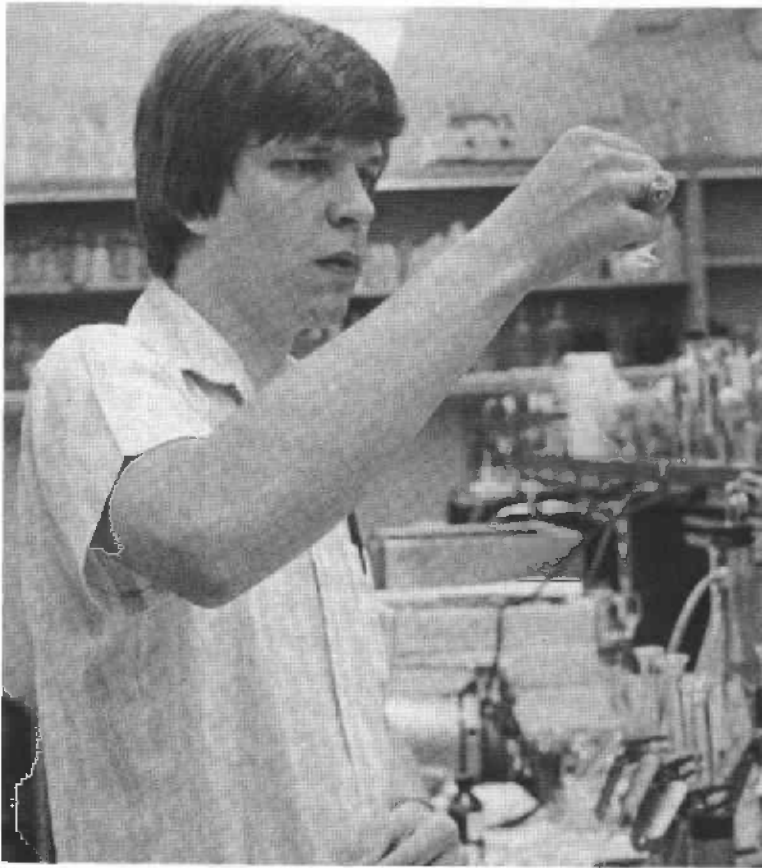


And besides helping provide the consumer with more variety and better food, research is also helping producers develop a more beautiful environment. With a growing ornamentals industry and increased consumer interest in beautifying the environment, there are new problems to be solved. One of the most expensive aspects of the nursery industry is the traditional ball and burlap methods of plant shipment. However, this expensive handling process may be phased out with the advent of a bare-root method developed by OSU scientists—a development which promises to save growers about 30 per cent on harvesting and shipping costs. The system also lends itself well to mechanical harvesting and denser plantings which could mean another increase in production efficiency.

Healthier crops, better production, damage prevention, easier pruning, more efficient pollination. The list of



horticultural experiments goes on and on, growing every day. And with a growing list like that, and growing populations, horticultural research needs grow, too.



Microbiology

One of man's greatest frontiers today is under the microscope.

Experiment Station research in the Department of Microbiology is unlocking the secrets of this world and finding ways to solve old and new problems of plant and animal life.

With one of the broadest programs of any university in the nation, OSU microbiologists are finding ways to fight problems of food resources and improve the environment on land and sea. The program continues to receive outstanding recognition nationally and internationally for its research, especially in the areas of food safety, fish diseases, dairy microbiology, marine and aquatic microbiology, industrial microbiology and genetics and physiology.

Procedures have been developed for production of methane from prime pollution sources such as farm yard manure. The treatment process provides a source of methane energy and leaves a residue that has excellent fertilizer and soil condition properties since practically all the desirable fertilizer nutrients are recovered.

Straw utilization studies have developed important methods of

conversion of straw to a substrate that can be utilized easily by food yeasts for nutritive protein and animal feeds. Studies have also included investigation for conversion of straw into fungal protein and into a fuel such as methane gas.

Food safety and diseases of man and animals are constantly investigated by Experiment Station microbiologists working with home economists, food scientists and animal specialists. Especially as man learns more about wildlife and fish, microbiologists will be called in to evaluate diseases and unknown problems.

Out of the research will come new understanding and improved ways to help keep diseases at a minimum and insure health and quality of the environment.

Farmers, food and dairy processing plants, the State Departments of Agriculture and Public Health all rely on OSU microbiologists for technical assistance.

By unlocking the secrets of the world under the microscope, new ways to help everyone live safer are being discovered.

Poultry Science

Farm fresh eggs. Plump, tender chicken. Succulent, juicy turkey.

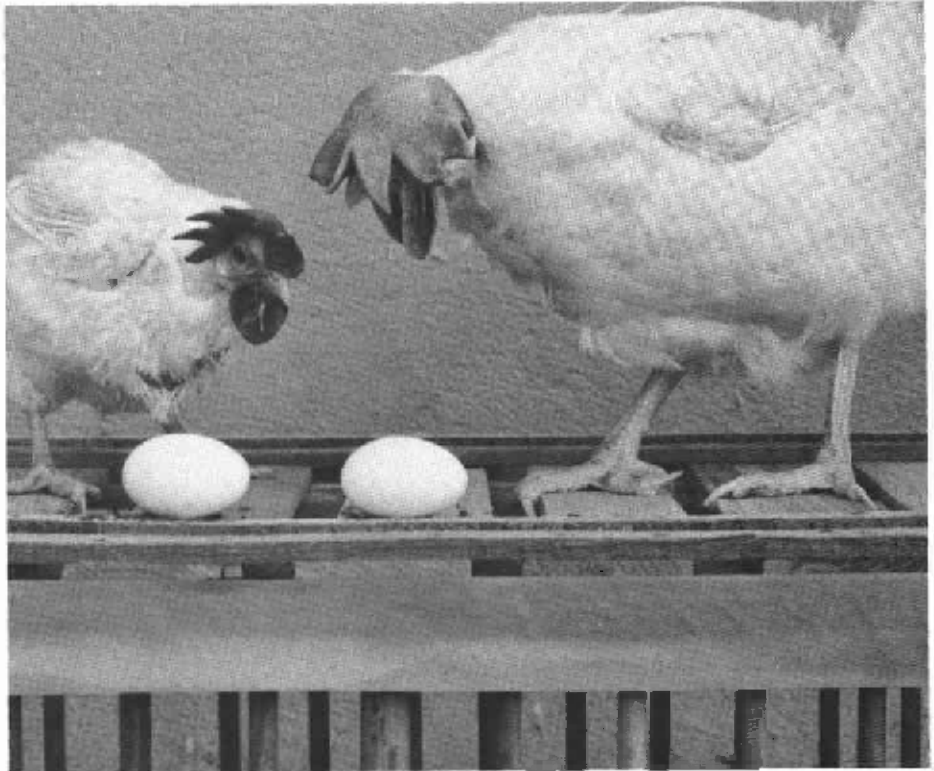
Oregon consumers expect the best from poultry products, and efficient poultry management methods developed by Experiment Station researchers in the Department of Poultry Science are helping to keep quality high while meeting consumer demand for inexpensive poultry protein products.

Oregon is nearly self-sufficient in the production of poultry products. At present, 83.8 per cent of the eggs and 62.3 per cent of the broilers consumed in the state are produced in Oregon. And turkey producers fill the quota for Oregon birds and ship an additional 9.3 per cent outside the state. Altogether gross annual receipts for Oregon poultry products total more than \$50 million.

Science is trying to make certain that production levels remain high and product quality remains excellent. Vitamin requirements for poultry are evaluated and new feeds are studied for their performance value. Higher fertility in laying hens is investigated and a new, smaller hen which requires less feed yet produces as many eggs as a standard-sized bird has been developed by Station scientists.

New management practices are also studied to help improve efficiency of the modern poultry plant, and waste utilization is also studied to help solve environmental concerns.

It's all part of a forward-thinking philosophy in the poultry science area where researchers try to keep the poultry industry ahead of consumer demands so there will always be enough to go around.



Soil Science

Ecology, environment, conservation, land use. Man's ability to use the earth's resources intelligently will determine his survival.

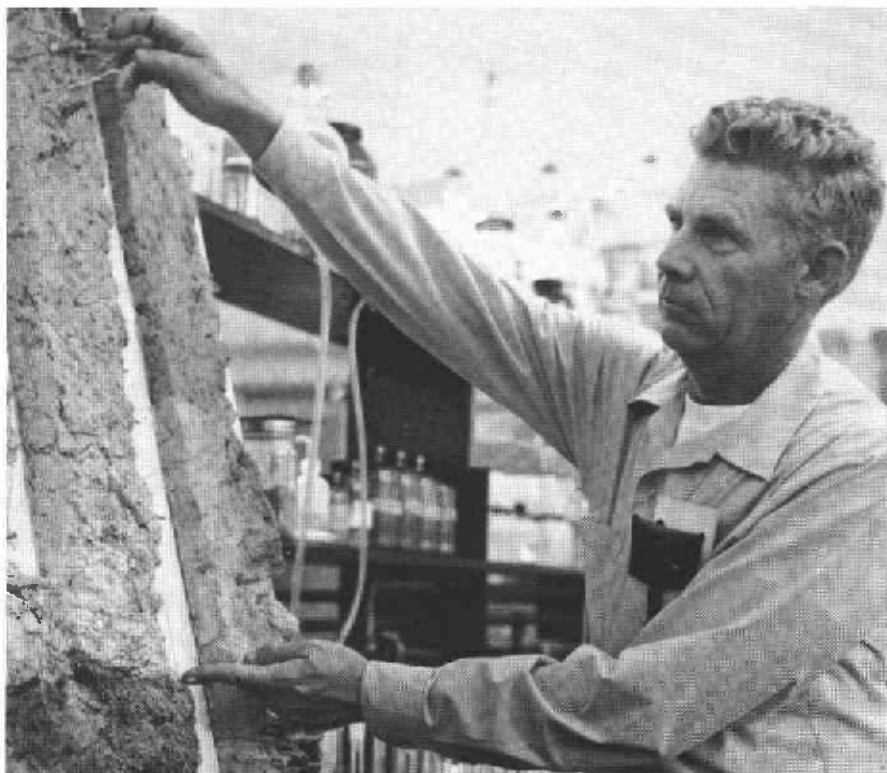
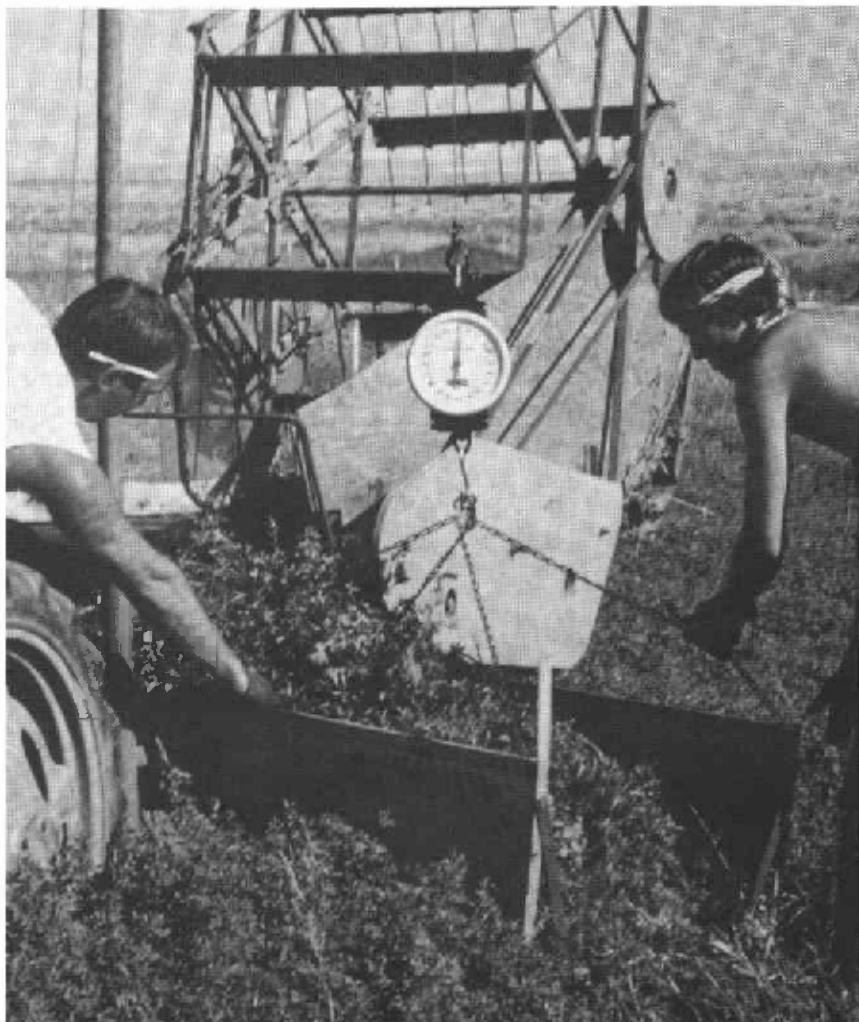
Experiment Station scientists in the OSU Department of Soil Science understand the worldwide desire to grow more food and fiber to help offset the pressures created by increased populations. Consequently, their studies center around defining soil conditions and land use planning to maximize plant growth and animal support.

The most basic element of soil science is identifying the chemical, physical and biological properties which determine soil "behavior." In some areas of Oregon, soils are too wet and require drainage. In other areas, the soil is too dry and irrigation is essential to provide maximum productivity. Some soils are too acid, or contain excess salts or alkaline. Others are worn out from over-use and under-fertilization or are eroded—all these factors are considered when soil samples are sent to OSU laboratories for "testing."

Once soil "properties are . . ." defined, the researchers can work with other professionals to assess what can realistically be done to make the soils more productive. In some instances, minimal amounts of fertilizers can be recommended for the soil, almost like a medical prescription. Social concerns and economic factors are also involved in determining land potential. For instance, large amounts of energy are required to produce nitrogen fertilizers needed to grow plants, so soil experts are trying to learn more about how atmospheric nitrogen can be fixed to plants and incorporated into the soil. And with this increased understanding, OSU researchers hope to find new ways to grow plants, saving money for both the farmer and the consumer.

New plant varieties for feed and food for man and animals are tested in different types of soils. Fertilizers are studied, irrigation systems and drainage are evaluated, waste products are looked at as new resources. All combine to help man get the most productivity from the land.

And in a growing world, knowing how to use the land wisely is becoming more necessary.





Statistics

Statistics are the building blocks of science.

Without a uniform way to understand the conclusions of scientific research, work would be at a standstill, or worse yet, lost in a sea of scientific controversy over a basic communications tool.

The Department of Statistics at OSU provides a wide range of both research assistance and basic statistical services to Experiment Station scientists.

That work may involve making a statistical model for an economic evaluation, charting toxicity in a food or surveying the population dynamics of a wild animal species. Statisticians also help researchers design their experiments. If surveys must be employed, the statistical experts point out various ways of designing surveys to achieve the maximum amount of information in the most economical way. Computer programming and data

analysis services also help the research work flow smoothly.

Work moves faster at OSU, too, because of better statistical and computing methods provided by the Statistical Interactive Programming System (SIPS). Data analysis is available from this system which enables research workers to look at results of analyses as their computation proceeds step by step. Rather than having to wait a day or more between each phase of the analysis, the researcher is able to accomplish the same results in minutes by having the results immediately on computer terminals.

New machines, better methods, more efficiency. Research consultation in the OSU Department of Statistics helps science work faster and more efficiently to solve the problems of agriculture in Oregon.

Veterinary Medicine



Animals, like people, need to see the doctor once in awhile.

When livestock and poultry producers lose animals to disease or must pay for additional treatments and immunizations, prices for healthy animals which do reach the marketplace go up, driving up costs for meat and fiber. According to one source, the money involved in treating animal diseases, and in lost animals, comes to \$30 million annually.

Consumer demands for smaller profit margins in animal production make livestock and poultry producers even more aware of the need to increase the efficiency of animal production through improved herd and flock health.

These producers are turning to Experiment Station scientists in the OSU Department of Veterinary Medicine to diagnose diseases of domesticated animals and wildlife and then find solutions to the diseases.

Gains are being made in such areas as isolating viruses in poultry and cattle, increasing knowledge of liver flukes, worms and parasites in sheep and cattle, determining the toxicity of tansy ragwort and identifying the transmitters of anaplasmosis in cattle.

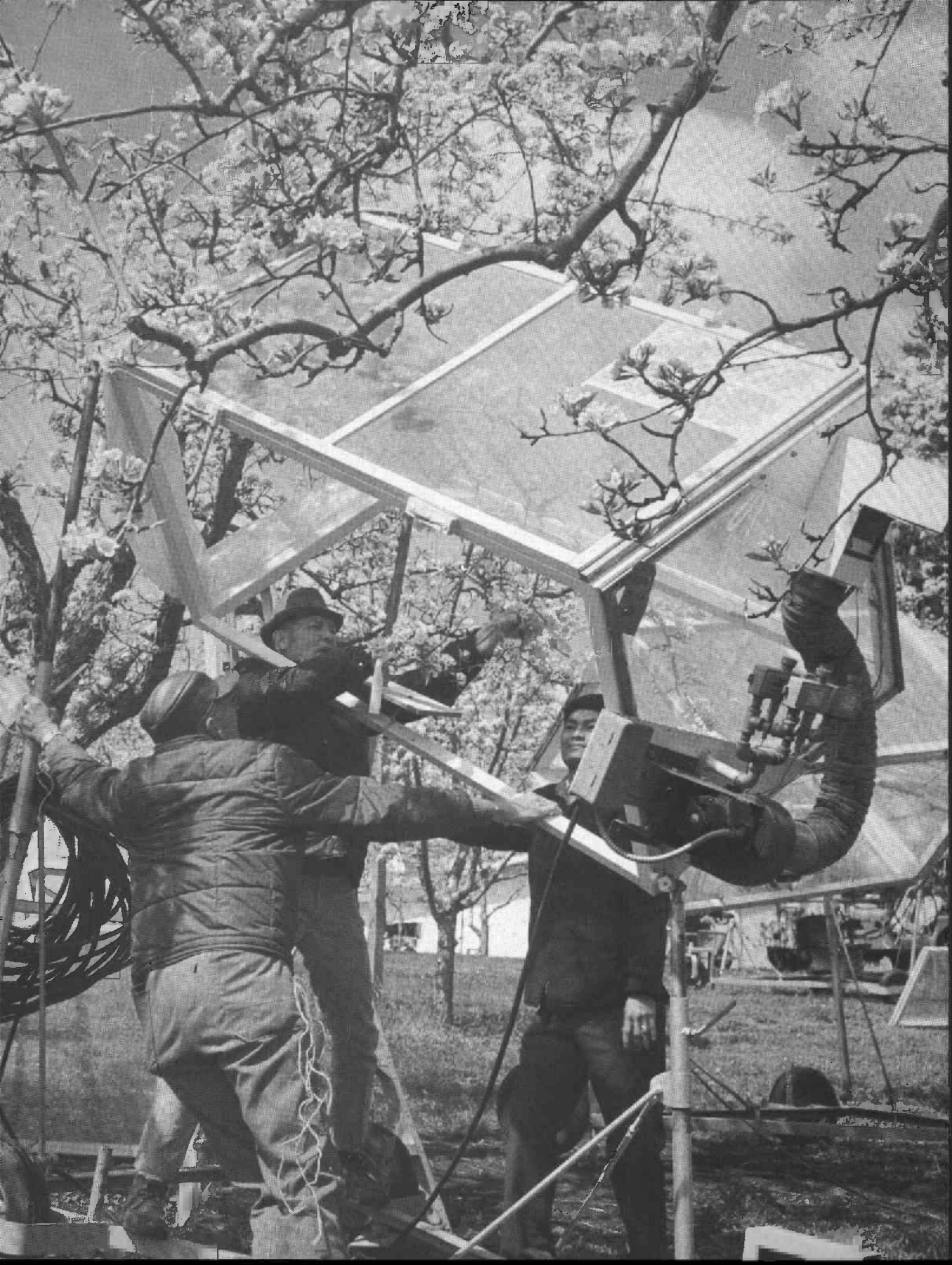
But for each old disease which scientists conquer, a new type of disease creeps into the country, threatening to devastate flocks and herds.

Early identification of disease has become increasingly important with the changing methods of livestock handling. Great numbers of animals and birds are concentrated in relatively small areas and are transported from one end of the country to the other in a matter of hours, increasing the hazards of exposure and transmission of diseases.

Laboratory testing by Experiment Station scientists is crucial in helping the State Department of Agriculture, the livestock producer and the veterinarian identify the disease, isolate the animal, institute treatments and prevent the spread of disease.

More research is needed, too, on wild populations of animals, birds and fishes. Especially interdisciplinary work will be required to insure the survival of wild species and in identifying their ability to transmit disease to domesticated animals and birds, and perhaps even to man. Knowing more about sick birds and animals will help stop or limit diseases and may mean millions of dollars in savings for livestock and poultry producers, and consumers, and benefit every living creature through improved health gains.





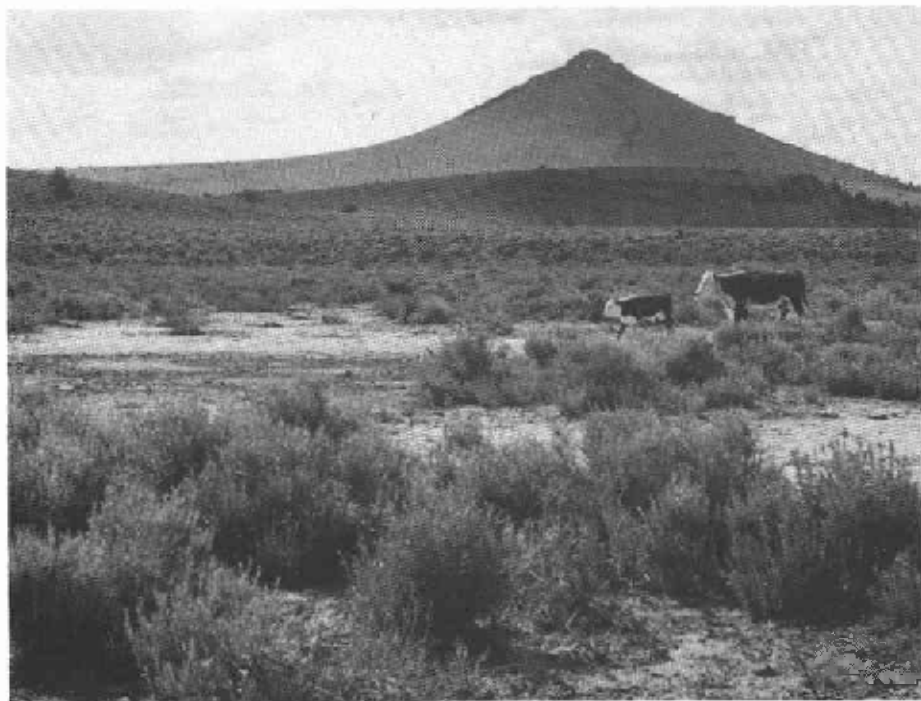
Branch Stations

Complimenting, coordinating and cooperating with the core of research conducted on the Oregon State University campus are the nine branch stations of the Oregon Agricultural Experiment Station.

Located in unique geographical, climatic and soil zones of Oregon, each represents a different focus on the diverse agriculture picture in the state. But combined, all serve to make Oregon's agriculture more productive.

The North Willamette Experiment Station near Aurora is in an ideal location to help Oregon's agriculture keep pace with the changing times. The station is located in the center of a rich agricultural area—farm and processed value of horticultural crops grown within a 35-mile radius of the station represent about one-third of Oregon's agricultural crop production income. But only 20 miles north of the station is the city of Portland, growing faster each day and spreading in all directions with new homes, shopping centers, roads and industrial areas. The new pressures of progress mean more work for the scientists who must help small fruit, vegetable, wine grape and ornamental nursery crop growers realize the full potential of the agricultural lands available. Researchers at the North Willamette Station are helping with tests of strawberries, raspberries, blackberries, grapes, ornamental crops and wheat, plus work with mechanical harvesters, drip irrigation systems and improved cultural and technical advances. By helping the grower become more productive, consumers, even in a fast-growing marketplace will continue to get full value from their food dollars.

Directly east of Portland on the Columbia River is the Mid-Columbia Experiment Station at Hood River where the emphasis changes from small fruits and vegetables to tree fruits—apples and pears. New methods of orchard management are studied, including drip irrigation and new methods of weed and pest control are investigated. Post-harvest problems are also researched, with scientists helping industry provide the consumer with fresh fruit all year long. But perhaps the most important area of investigation



continues to be frost damage. Experiment Station researchers are trying to find new ways to delay blooming until the danger of frost has passed. New methods are being studied, some cooperatively with the Southern Oregon Experiment Station near Medford where pears are also an important crop. By finding new ways to fight this old problems, scientists hope to halt losses which occur when late spring frosts ruin apple and pear crops, causing growers to lose money and consumers to pay higher prices for scarce fruit, as well as eliminate the smokey oil-fired smudge pots.

Heading even further east along the Columbia River is the Columbia Basin Agricultural Research Center at Pendleton, with satellite headquarters in Hermiston and Moro. This area is becoming a major dryland research location for the Agricultural Research Service of the U.S. Department of Agriculture. Research with cereal breeding and testing, weed control, irrigation, soil fertility and soil and water conservation being conducted in Oregon have impact on both a domestic and international level. But this part of the state is also an important region for livestock production and the feeding and progeny tests conducted at the Hermiston station serve the livestock producer, helping to make sure the best pieces of meat reach the marketplace at the lowest possible prices.

Also combined to coordinate research and services are the Union Station in the foothills of the Wallowa Mountains

at Union and the Squaw Butte Station in the high desert area near Burns. Known as the Eastern Oregon Agricultural Research Center, these stations share the responsibility for research to serve the range livestock industry, an industry with cash marketings representing about 25 per cent of all agricultural market sales in Oregon. The arid rangelands, flood and mountain meadows and high elevation forested ranges on these stations are typical of the majority of the rangelands in Eastern Oregon and much of the states of Washington, Idaho, Nevada and California. Research provides new knowledge in the areas of improved forage production, brush control, all phases of range cattle and sheep production and management, the compatibility of domestic animals and wildlife and the overall effect of these management factors on the ecology and environment. Efforts of Experiment Station researchers, U.S.D.A.-Agricultural Research Service personnel and cooperation with various campus departments, the U.S. Forest Service, Bureau of Land Management and the Oregon Wildlife Commission combine to answer a wide range of scientific questions.

Near the Oregon-Idaho border community of Ontario is the Malheur Experiment Station. Established in 1942 at the request of local farmers and businessmen, the Malheur Station serves the intensively irrigated agriculture of the Snake River Valley. This area has a favorable climate for crops, and soils are highly productive, though difficult to manage. Major crops in the area are potatoes, onions, sweet corn, sugar beets, cereal grains, corn silage and alfalfa, all grown on the more than 200,000 acres under irrigation in Malheur County. Major attention is now focused on chemical weed control, but new methods of farming, leading to greater productivity are constantly surveyed for their usefulness.

Under the shadow of California's Mt. Shasta, but still in southern Oregon is the Klamath Falls Experiment Station where the emphasis is on cereal grains, forage crops and potatoes. Because much of the land where these crops are grown is reclaimed marsh land which presents special soil fertility problems, and because killing frosts can occur at any time of year, Experiment Station research plays a vital role in helping farmers of the Klamath Basin maintain their crop production levels through better varieties and improved growing methods.

North of Klamath Falls, but still in the high altitude area where summer



freezes are a hazard is the Central Oregon Experiment Station at Redmond, with additional research land near Madras. The problems experienced by farmers in this area are similar to those experienced by farmers near Klamath Falls, but added is the influence of volcanic ash in the soil. Fertilization studies are important in this region where potatoes, cereal grains, peppermint, grass seeds and forage crops are the agricultural mainstays.

The final station is one of the more diverse. Located near Medford, the Southern Oregon Experiment Station is helping improve the tree fruit, seed, grain and vegetable crops of the Jackson, Josephine and Douglas County regions. This area differs from others in western Oregon because of higher altitude, late spring frosts, less than half the annual rainfall and shorter, but warmer, growing seasons. Heavy clay soils with decomposed granite yield up thousands of acres of pears, vegetable seed crops such as onions, beets and carrots, plus wheat, barley, sweet corn, tomatoes, onions, soybeans and grapes. But research is needed to keep the diverse number of crops healthy, so seed crop research, insect and disease control and frost prevention work along with new cultural and technical techniques are studied by Experiment Station scientists.

Cooperation is a big part of the success of the branch stations. By heeding the demands of consumers, listening to the needs of the producers and coordinating research with scientists on campus and at other branch stations, research programs are developed which can answer the problems relating to agriculture as quickly and comprehensively as possible.

Cooperation, coordination, communication—it's all part of work at the branch experiment stations where science is helping Oregon grow.

