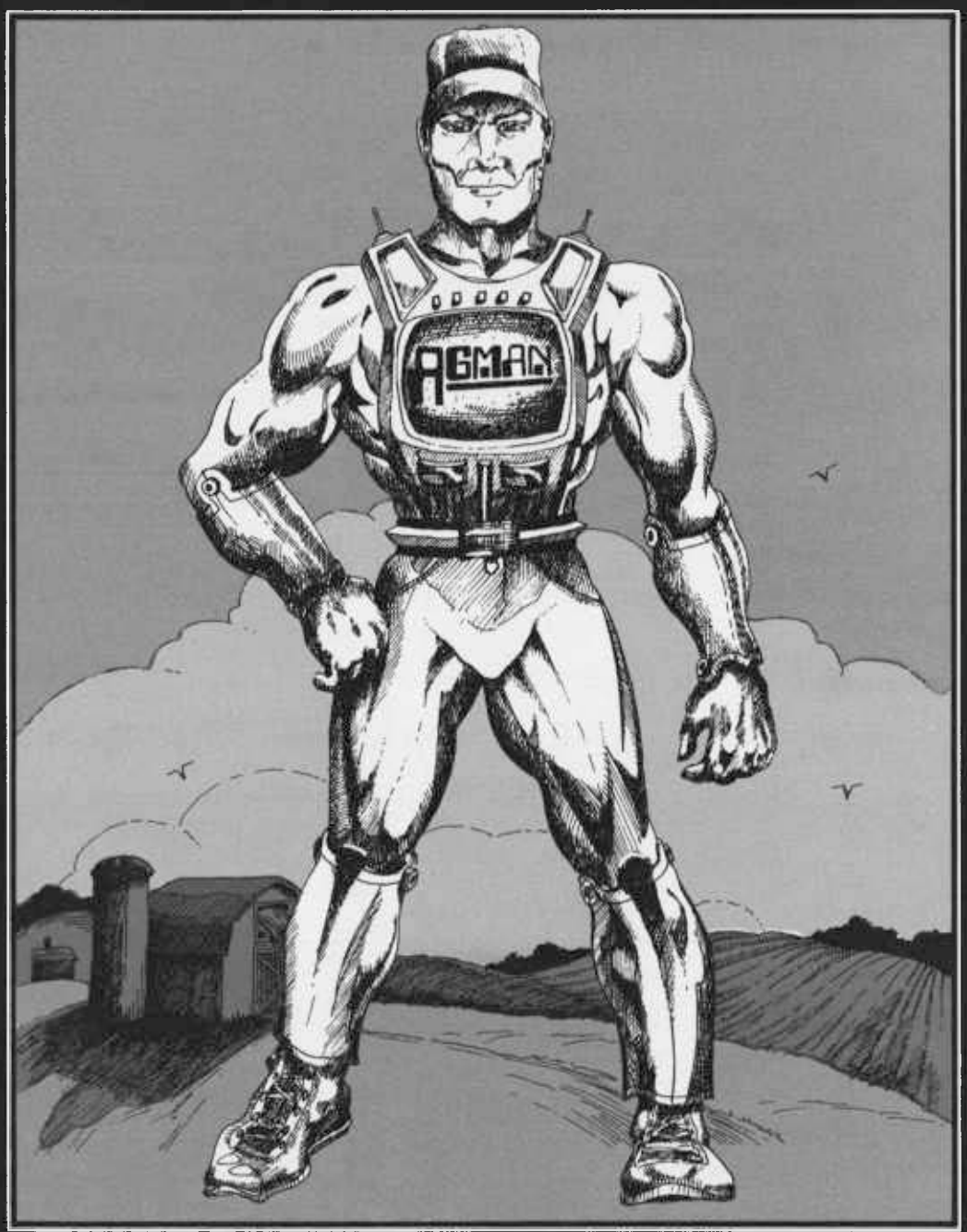
OREGON'S AGRICULTURAL

progress

FALL 1983

Move Over, PAC-MAN



Agricultural Experiment Station
Oregon State University

comment

John R. Davis,
Director, Oregon Agricultural Experiment Station

'I've eaten shark meat, granola and Twinkies'

"You are what you eat" someone once said. If that's the case, I should fly because it seems most of the time I eat like a bird. My wife apparently disagrees, because she says I eat like a hog. She also lets me know that a bird eats its body weight about every day. Most people really are a lot like the food they eat. Picky eaters are picky people; beer drinkers have fun, but don't have as much class as wine drinkers; Italian people, mainly, eat Italian food; and you know what they say about men who eat quiche.

I know people who eat only vegetables, or things that grow on bushes, and they seem disgustingly healthy. I also know people who eat meat practically raw and seem to thrive on it. I've eaten shark meat, squid, granola, yogurt, Twinkies and even chocolate-covered ants. I don't feel any different and I'll probably live just as long. But it's the "probably" that nags at me — not enough to get me to change my eating habits, but enough to make me realize that it is good to be more informed about what's best to eat.

Thanks to research, I believe we are on the verge of understanding a lot more about nutrition and its effect on general health and personal well-being. Researchers in the Department of Foods and Nutrition in the School of Home Economics have found, for example, that distance runners who load up on carbohydrates before competing in a meet may actually cause abnormal heart patterns. Projects supported by the Agricultural Experiment Station have also dealt with mineral nutrition (iron, zinc, selenium, etc.), vitamin B6, nutrition of elderly people, preventing biological contamination of processed foods and food-borne illnesses, effects of meat preparation on meat quality, and other aspects of human diets.

A big problem with doing research in human nutrition is that human subjects are supposed to survive the experiments. Researchers can't fool around as much as they can with mice and rats. The research must be painstakingly planned and executed, and it takes much longer to obtain results. But if it is true that we are what we eat, nutrition research could be among the most important we can undertake. In fact, there is every indication nutrition will be found to be important in many diseases, such as cancer and Alzheimer's disease (which causes premature aging).

Many food products are produced and processed in Oregon, so production agriculture certainly will be influenced by trends in human nutrition. Likewise, all Oregonians are consumers of food, so the overall physical and mental well-being of all Oregonians will benefit from this research.

Meanwhile, as we wait for answers to the question of what is proper human nutrition, eat a balanced diet if you want to be a balanced person; eat like a junkyard dog and you'll probably be as mean as a junkyard dog. Whatever you do, start to fine-tune your interests and knowledge about foods and nutrition and look for the results of our research—maybe you'll feel healthier and live longer.

• • •

By the way, don't forget to mark the College of Agricultural Sciences' 1984 Agricultural Conference Days on your calendar for February 28 and 29. There will be sessions on a number of timely topics including international trade and agricultural policy, new ventures in Oregon agriculture, computer use on the farm, and agricultural careers for our young people. Charles Kuralt of CBS's "On the Road" television show is scheduled to speak at the awards banquet on February 28. ■

OREGON'S AGRICULTURAL
progress

FALL 1983

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Cover: AGMAN, a new information network being developed at OSU, will help Oregon farmers plunge farther into the world of computer-assisted agriculture. Story on page 12. (Drawing: Sarah Peck, Ice House Graphics)

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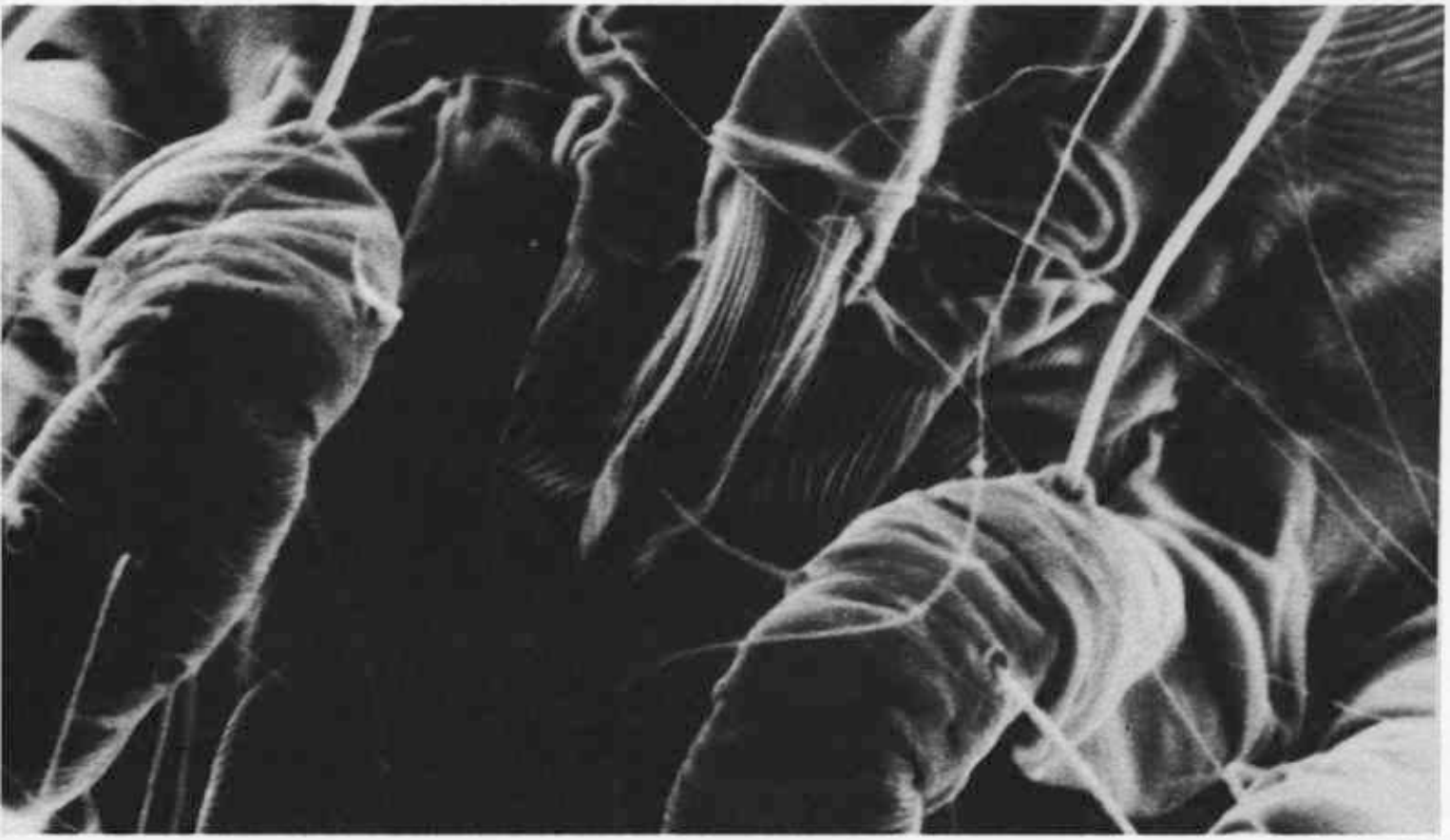

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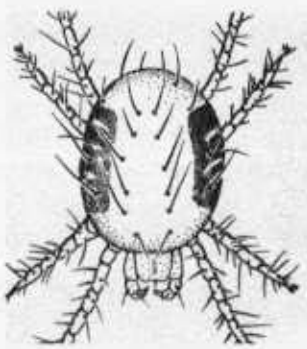


The photo above, taken with an electron microscope and 700 times life size, is a front view of a twospotted spider mite (the bug is hardly visible to the human eye). The drawing is of an adult twospotted spider mite.

Little Big Mite

OSU entomologists wonder if they can outmaneuver, if not overpower, a small pest with a huge appetite

A tiny, pale green bug that is hardly visible has become a "mighty mite" of the crop world in Oregon.

Borne by the wind and a world traveler that is at home on commercial and house plants, this small pest causes injury to more than 150 economically important crops. It has been estimated that the species is responsible for losses amounting to 5 percent of the world's agricultural production.

The culprit: the twospotted spider mite, so called because of two spots on its back that distinguish it from hundreds of other spider mite species.

The most destructive of the spider mites, it attacks Northwest apples, pears, hops, small fruits, berries, many ornamental plants—in fact, it will attack just about any plant.

The twospotted spider mite causes plant injury throughout the state, with the most serious problems occurring in mint in Jefferson and Crook counties.

Ralph Berry, Experiment Station entomologist, knows the mite well. He has been studying it since 1968 when he became an OSU faculty member.

"The twospotted spider mite is a formidable problem because of its rapid production rate—a full cycle every

10 to 14 days in hot weather—and the fact that it goes into the ground to overwinter, appearing in the spring ready to launch more populations," said Berry. "The many populations make the mite rapidly become tolerant, then resistant, to chemicals that once controlled it."

The pest causes injury to more than 150 economically important crops.

Berry and other members of an OSU entomology department team have been studying the effects of the twospotted spider mite on plants, especially mint. Now the team is considering a switch: studies of the effects of the plant on the mite, in an effort to further understand the relationship so the pest can be controlled.

Other team members are G. W. Krantz, Anna B. Marin, K. C. Larson, now at the University of Oklahoma, and Jack D. DeAngelis, now on the faculty of the University of Mississippi.

"Other scientists have established that spider mite feeding disrupts leaf surface layers and interferes with life-sustaining mechanisms of the leaf," said Berry. "We have been studying the influence of mites on the actual physiology of the host plant in a much more detailed fashion."

Identifying stress induced by the twospotted spider mite is crucial to understanding how plants compensate for injury from the feeding, he said. An understanding of the mechanisms of injury also is important to plant breeders concerned with selecting plants that tolerate pest injury.

The mites spin webs, then they live comfortably on the underside of the leaf. Using their mouth parts, they pierce the leaf "skin" and suck fluids from injured cells.

"It has been reported that the twospotted spider mite injures as many as 18 to 22 cells per minute," said Berry. "Primary injury to the epidermis causes severe water loss through the damaged surface."

Water loss from the injuries, particularly at night when the plant usually closes leaf openings, causes plant water stress during the day.

"Injured leaves are much like a balloon filled with tiny holes, with water escaping constantly and not being replenished," said Berry. "Symptoms of such injury are severely wilted leaves that eventually turn brown and drop from the plant."

House plant owners can look for small yellowish spots that turn brown.

The research team also has found that disrupting a plant's water balance affects other physiological processes. Openings on the leaf surface remain closed, leading to reduced photosynthesis. Continuous water loss from injured cells often results in an accumulation of soluble leaf sugars in leaf cells because plants use the sugars to try and seal openings to maintain cell pressure and prevent collapse. That reduces the energy in the form of soluble leaf sugars available for plant growth and reproduction.

House plant owners can look for small yellowish spots that turn brown.

"In the case of peppermint, our studies have shown that spider mite injury causes changes in the oil constituents normally produced by the plant," said Berry. "Stress induced by the spider mite hastens maturation of the oil, which may contain relatively higher amounts of undesirable components than commercial oil."

Mint, he said, is particularly vulnerable in midsummer when oils are being manufactured. The scientists recommend that growers begin using chemicals as soon as an average of five twospotted spider mites are found on a leaf.

"All our work is designed for pest management," said Berry. "That means a way to manage insects so that more accurate control decisions can be made in mint and other crops."

Recently the team found clues suggesting that essential oil compounds in mint may decrease the reproduction rate. However, it appears these compounds also may help the twospotted spider mite survive by giving it resistance to insecticides. If confirmed, this could lead to plant breeders selecting plants without the oil ingredients that give this boost to the mite.

"We also are working on another proposal, looking at the influence of host plants on variegated cutworms (they are bigger and easier to work with) to see if the same compounds found in mint actually increase the tolerance of cutworms to insecticides," said Berry.

In the meantime, the twospotted spider mite will continue happily sucking up the contents of plant cells—and profits—in Oregon and around the world. ■

OSU entomologist Ralph Berry looks for twospotted spider mites on the leaves of peppermint in his laboratory.

Blinded by the White

Milk is what John Marcek and Lloyd Swanson see when they switch on special winter dairy barn lighting

Sometimes it is nice to fool Mother Nature.

That's what OSU animal science graduate student John Marcek and his supervising professor, Experiment Station animal scientist Lloyd Swanson, found when they tested the idea of using powerful lamps to artificially extend the length of the day in a dairy barn (the photoperiod, in agricultural research lingo).

The researchers learned that more light in Oregon's dairy barns at certain times of the year would produce higher milk yields (enough, they calculate, to give dairy farmers almost $40 a year in additional profit from each cow).

"This is a relatively new area of research," said Swanson. "It's been found in other livestock that photoperiod has a significant effect on productivity, growth rate, feed efficiency, etc., but until recent years nobody had looked at this in dairy cattle."

The theory, he said, is that extending the photoperiod will make cows eat more and produce more milk.

Researchers at Michigan State University found that exposing milk cows to 16 hours of light a day increased the amount of milk they produced (Michigan State scientists are testing the approach at about a dozen dairy farms to find out how it works in commercial situations).

In the winter of 1981, Swanson and Marcek began the first of two winters of tests with a different approach.

"Michigan State used a totally enclosed barn where the environment and lights were totally controlled. One of

the reasons for doing the research at OSU was to see whether photoperiod had a significant effect under more natural conditions like Oregon dairymen might have, as opposed to the conditions imposed at Michigan State," said Swanson.

Extending the photoperiod will make cows eat more.

The OSU researchers housed cows in a free-stall barn that was open on two sides. "All the cows were set up in identical housing and feed was identical," said Marcek, pointing out that the only important environmental difference between the study animals and average Oregon dairy cattle was light exposure.

Marcek and Swanson exposed one group of cows to artificial lighting for 18 hours a day during the fall and winter months (October through March). They exposed cows in a control group to the natural photoperiod, which ranged from nine to 12 hours a day.

"In the Michigan State study, they found there was an increase in milk production but no difference in the percent of butterfat," Marcek said. "We did see an increase in milk yield and percent butterfat, resulting in an increase in 4 percent fat-corrected milk."

Dairy farmers get paid for the butterfat content of milk, as well as for the volume of milk, the researchers explained. A formula is used to combine butterfat percentage and volume into one number expressed as the amount of 4 percent fat-corrected milk. A cow that produces milk containing less than 4 percent fat is adjusted downward and one that produces milk with more than 4 percent fat is adjusted upward.

The researchers saw an increase of about 15 percent.

"It takes more energy for a cow to produce butterfat than it does to produce the other components in milk," said Swanson.

On the average, the researchers saw an increase of about 7 percent in the amount of 4 percent fat-corrected milk produced by mature cows, and no increase in first-calf heifers. That increase would have a market value of $61 per mature cow per year, said the researchers. Because 30 percent of the cows in most dairy herds are first-calf heifers, the increased milk yield would have a value or $40 per cow on an entire-herd basis, Marcek said.

"It certainly would be economically significant," said Swanson. "Artificial lighting would not be very difficult for dairymen to adopt. I think it has a lot of potential."

Most dairy barns have some type of lighting system, but those probably would have to be replaced, said the researchers.

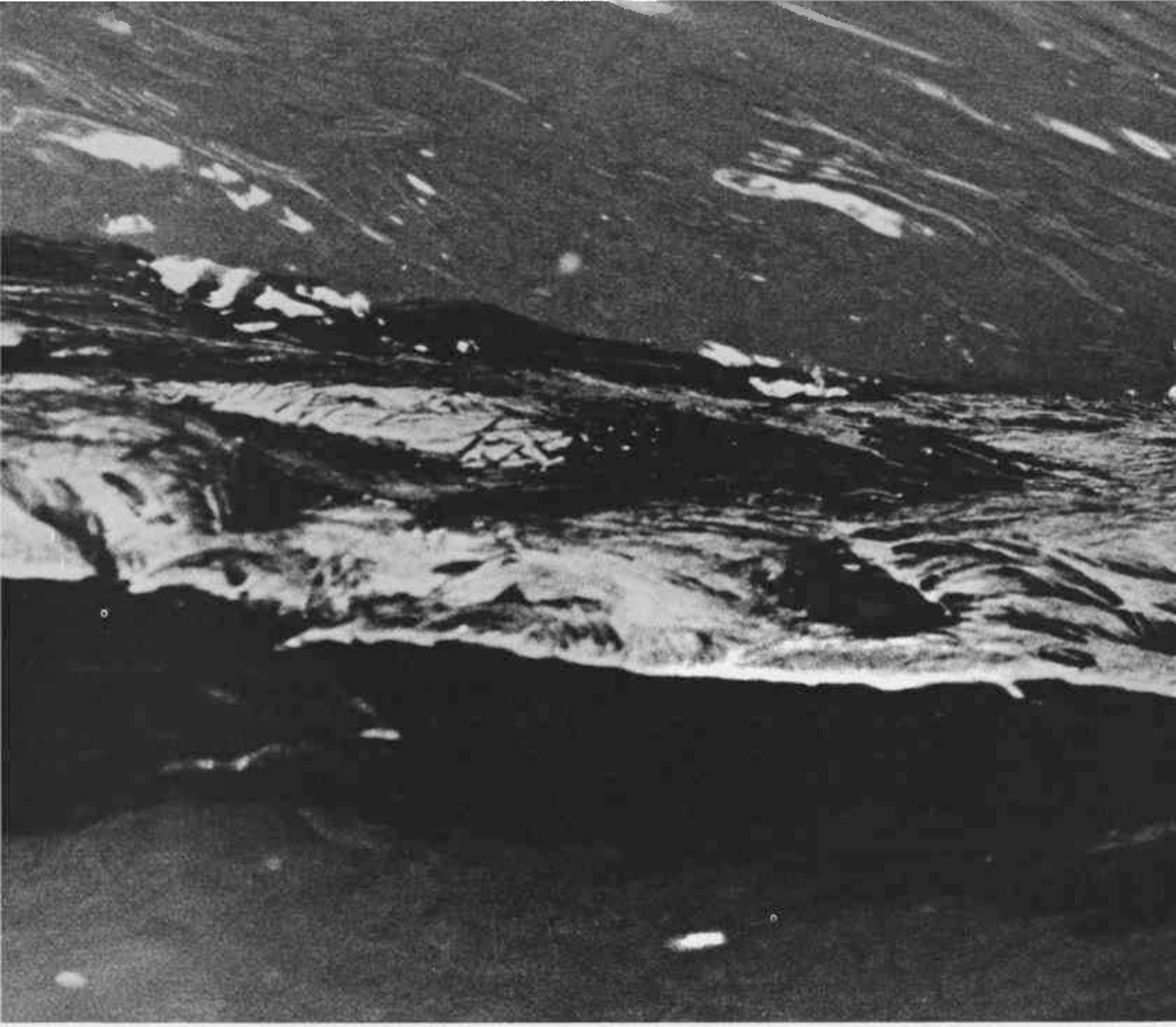
"Lights that are commonly left on in dairy barns as safety measures do not have a high enough intensity to affect milk production," Swanson said. But the cost of replacing them would not be prohibitive, he added.

In a typical dairy barn, each cow requires about 88 square feet, including stall, alley and feeding space, Swanson said. The cost of lighting that area for a year would be about $2.62 per cow, including electricity costs for lighting 18 hours a day for six months and the cost of lights, averaged over their 10-year life, Swanson estimated. That's a $15.10 return for each dollar invested, considering the $40-a-year expected return for each mature cow.

According to Marcek, one high-pressure, 400-watt sodium vapor lamp—the type needed—costs $165 (March 1983 price). Such a lamp, hanging 21 feet above the floor, would light space for 28 cows.

"If the dairy farmer can duplicate our results, and make almost $40 a cow just by manipulating day lengths, I think that will have an impact on the dairy industry," he said. ■

Graduate student researcher John Marcek, right, holds the type of high-powered lamp he and animal science professor Lloyd Swanson, left, used to "extend" winter days for dairy cattle. In the background, several of the lamps hang in the OSU Dairy Center.



The Belittled Beaver

The webfooted rodent deserves some praise, claim two scientists

Beavers are pretty scarce in the Beaver State these days, but it wasn't always that way. It's estimated that in the mid-nineteenth century there were nearly a million beavers in Oregon. Today, there are an estimated 68,000.

Reasons for the decline: Decades ago, the animals were trapped almost to extinction for their pelts; more recently, they've suffered from the reputation of being a nuisance, largely because of their dam-building activities. When gathering materials for dams, they destroy valuable trees, and the dams themselves can flood prized areas and are thought to be obstacles to fish moving in streams. Consequently, today many beavers are trapped by licensed trappers.

The beaver's plight is unfortunate,

Joel Davis

at least with regard to Oregon's fish resources, say two stream ecosystem researchers at OSU, because studies they've done suggest the beaver is a boon to the valuable fish that live in the state.

Cliff Dahm, a chemist and research associate on the OSU Department of Fisheries and Wildlife's Stream Team, and Jim Sedell, a fisheries biologist with the U.S. Forest Service, found that the beaver's presence in a stream has a positive effect on fish, especially the coho salmon that is Oregon's most economically important salmon species.

"The premise we're working under is that streams, as they've been restructured by management activities, have basically been made less productive and more sterile," said Dahm.

Many Oregon streams are tough on beavers.

"These stream systems have a clear-water, low-nutrient condition that just isn't conducive to supporting many young salmonids (salmon-type fish)," he said. "What we're looking at is a situation where an animal such as the beaver can have a significant effect on stream habitat by what they put into the stream through dam building, woodcutting, eating, defecating and living in the system.

"Beavers also expand the stream area by causing water to pond behind the dams they build," said Dahm. Many people believe these dams restrict the movement of fish in a stream but, by and large, this isn't true, Sedell added.

A quick check reveals not everyone totally agrees with the researchers on that.

Example: "I used to blow up a lot of beaver dams on smaller streams. They were a barrier to fish at certain water levels, like in late fall when the chinook (salmon) start in," said Woody Holderman, a stream improvement foreman for the Oregon Department of Fish and Wildlife for 30 years before he retired in 1977.

Not everyone totally agrees with the researchers.

At higher water levels, some salmon jump over the dams or wiggle through them, although he's found dead fish that either didn't jump far enough or were trapped trying to swim through, Holderman added.

"But, most generally, their dams wash out in high water and the fish can move on," he said.

Regardless of fish movement, Dahm said, streams with beaver ponds have much more habitat for aquatic life and more food for that life.

"Therefore, you have a higher carrying capacity for life in stream systems that have been influenced by the presence of beavers," he said.

The beaver research project began two years ago when Sedell, doing habitat research work on Knowles Creek near Mapleton, noticed several stone dams (see related article, page 11) built by beavers along the creek. Sedell also noticed that these dams raised the water level in the pools behind them five to six inches.

In the course of his investigation he calculated the amount of water in the stream, finding that 20 percent of it was in these dammed-up pools.

"This was worthy of note because the Oregon Department of Fish and Wildlife had done research on the response of coho salmon to ponded water and found that where the water volume was higher in a stream more juvenile coho could rear there," Sedell said.

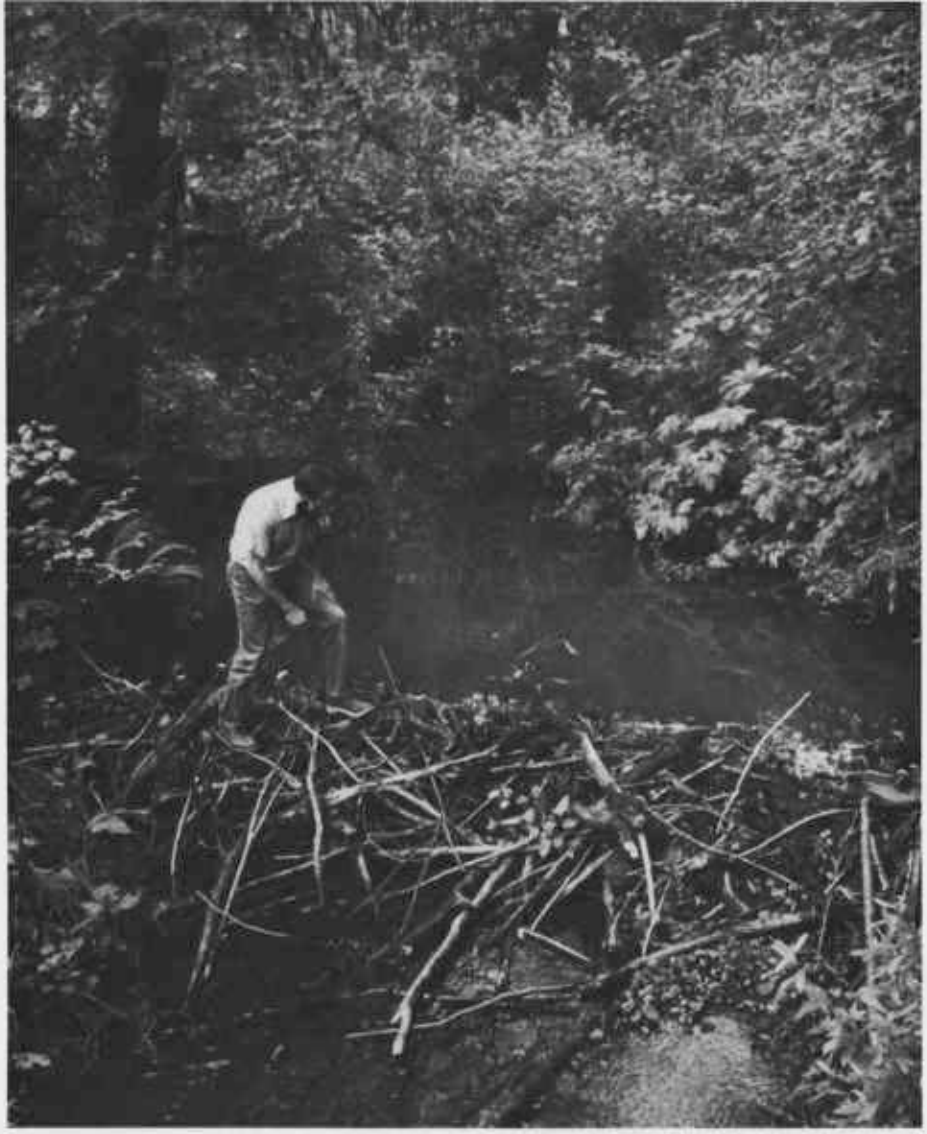
Sedell became interested in how beavers affect stream habitat for fish, and eventually Dahm joined in the project to help find out what kind of materials beavers bring into the streams and how these materials interact.

"Initially," Sedell said, "our feeling was that the beaver was not only ponding water in the stream, but bringing organic materials into the stream as well. Basically, I was looking at the chemical situation in the stream in terms of carbon."

The beaver's presence . . . has a positive effect on fish.

However, when Dahm investigated he saw a larger picture of what was taking place.

"Cliff found that inorganic sediments interacting with dissolved organic materials, and similar kinds of activity, served to create a rich food base for fish," Sedell said.



Top photo: Beavers increase the food supply in streams, contends OSU fisheries biologist Jim Sedell, shown inspecting a dam in McDonald Forest near Corvallis. Lower photo: Sedell's research partner, stream ecologist Cliff Dahm, examines material from the small creek's bottom.

After making this discovery, Sedell and Dahm found that the fish were bigger in stream areas immediately below beaver activity. This was true, Sedell theorized, because the beaver activity developed such a rich food source that it enhanced the food chain for aquatic life.

Before beginning the study, neither Sedell nor Dahm knew any more about beavers than the average person ("almost nothing"), they said.

"Over the past 60 to 80 years a lot of literature on the beaver has been published—everything from how to make a stew out of it to how to pelt the animal to what its habitat is and its history in North America," Dahm said. "However, little of this literature contained the kind of information we were looking for."

"Basically it has been a case of having to find sources of information on the beaver, and in the process we've acquired quite a library on the subject," Sedell added. "Surprising as it may seem, there are no beaver experts on the OSU campus or, for that matter, in Oregon," he said.

Some researchers have concluded that the beaver is a nuisance.

"Most of the management of beavers consists of handling nuisance complaints," said Sedell. "Beavers may be responsible for plugging drainage culverts resulting in flooding of roads, or they may chew up trees on private land. These animals are then trapped to eliminate the problem.

"There's a lot of negative inertia to overcome with the public where beavers are concerned," he continued. "Among fisheries biologists, the beaver is generally viewed as having a negative influence, also."

"What should be remembered is that coho salmon evolved in Pacific Northwest streams where beaver were a major ecosystem feature," said Dahm. "This seems to indicate the beaver has a positive effect on the aquatic life habitat in streams, rather than being a nuisance.

"We're missing a bet by not taking advantage of something that has been a natural part of stream habitat since long before man came on the scene," he added. ■

Dams of stone?

You thought beavers build wooden dams?

Oregon beavers build stone dams, too, according to Jim Sedell and Cliff Dahm, OSU scientists studying the animals' impact on fish in streams.

"We've seen a lot of them in Coast Range streams," said Sedell. "It's just like little kids had gone out and built a low dam. They take their paws and pile up stream gravel six inches to a foot high."

Purpose of the stone dams, Sedell assumes, is to keep the water level high enough along stretches of a stream so a beaver can swim or slide from pool to pool, rather than having to get out and walk.

"They're just osbtructing a little water to keep the runway moist. These streams are swift, they're full of sandstone and practically no mud, and it's hard to build a wooden dam if there are no objects like log jams to use as an anchor," said the researcher, a fisheries biologist.

Many Oregon streams are tough on beavers, compared to streams in other prime beaver states, he said.

"In Mississippi, where it's flat, they can put up a dam 18 inches high and flood 40 acres," he said. "But many parts of Oregon that were great for that, like the Willamette Valley and the dairy farm land near the coast, have been taken over by people.

"In a lot of our streams, they use wood, rocks and mud—everything they can—to build their dams. They work hard in the spring and summer and then get blown out in the winter when the water level rises and the current gets stronger."

Just the same, beavers definitely are making a comeback in Oregon, especially the Coast Range, said Sedell.

"I think a lot of the reason in the Coast Range is that the old-growth fir has been harvested and there's a lot more deciduous timber coming in," he said.

There also are a lot of beavers in Eastern Oregon and some in areas such as the Willamette Valley and the Cascades, said the scientist.

According to Sedell, the Coast Range beaver's diet consists mainly of the inner part of bark from alder and willow trees, but they also eat salmonberries, blackberries, herbs and grasses.

"You'll see where they've chewed cedar and other conifers they obviously weren't using for dams. That isn't feeding," he said.

Beavers must chew regularly to "whittle down" their long, quick-growing teeth (remember the choppers on "Bucky Beaver" of the television toothpaste commercials of yesteryear?), explained Sedell, or their teeth will curve back into their jaws.

Oregon beavers, which are about two feet long and weigh about 25 pounds, tend to range (one breeding pair to an area) along a one-fourth- to one-half-mile stretch of stream, according to Sedell. They build wooden dams 40 feet or more long and up to 5 or 6 feet across. The animals live in lodges in the dams, but they also dig burrows along the stream bank, just under the surface of the water, to use as temporary shelter.

The animals have their young, usually litters of two in Oregon, in the spring.

States with the largest beaver populations are Wisconsin, Michigan, Minnesota and Mississippi, said Sedell. ■

HARD TIMES, SOFT DISKS

Scientists believe a new computer network will help Oregon farmers stay competitive

Move over, PAC-MAN. AGMAN's coming to Oregon.

That's the name, short for agricultural management, Experiment Station researchers have given to a statewide, computer-based information network they are developing (and already are testing in Marion, Jackson and Umatilla counties in cooperation with OSU Extension Service specialists and agents).

It's not a game. In the researchers' view, Oregon is lagging behind some states in using one of the most powerful new farming tools of the century, the computer. AGMAN and other farm management services under development may help the state catch up in computer-assisted farming—perhaps even surge into the lead, says Brian Croft, an Experiment Station entomologist.

Croft is a leader in the OSU push to help farmers take full advantage of the computer. The effort crisscrosses traditional campus boundaries, involving researchers and Extension specialists in most departments of OSU's College of Agricultural Sciences, county Extension agents, and personnel from other campus units like the atmospheric sciences department and the Computer Center.

> The effort crisscrosses traditional campus boundaries.

It's nothing new to Croft. The entomologist came to OSU in 1982 from Michigan State University, where he was national director of a federally funded project developing computer models for apple crop management. The federal funding came to OSU with Croft and served as seed money for attracting additional public and private funds being used to develop the computer-based farm management systems.

The idea behind AGMAN is "networking"—gathering information from many sources, such as farmers in Oregon and other states, scientists and Extension personnel at OSU and other universities, the U.S. Department of Agriculture and the U.S. Weather Service, and making all that data available to whoever wants it.

Eventually, through computer terminals at Extension offices in the state's 36 counties, and through home- and business-based microcomputers, people in Oregon's agriculture industry, and related businesses, will be able to "tie into" AGMAN and take out information ranging from market prices for beef, wheat and other commodities to the current life stages of crop pests in various parts of the state.

> "Computers are great at assembling the information farmers need."

Because the AGMAN data base will contain up-to-date weather figures, the latest agricultural price quotes, statuses of insect populations, and so on, it will help farmers, salespeople, shippers and others make more effective management decisions, Croft said.

The entomologist, who is working on AGMAN with Kevin Currans, a computer specialist in OSU's entomology department, points to Integrated Pest Management, or IPM, as a good example of how AGMAN will help farmers.

"IPM means using tactics to achieve pest control that are cost effective, minimize environmental side effects and are compatible with society's goals," said Croft, explaining that an important part of the program involves monitoring insect life cycles so you can spray "bad" bugs only when they are apt to do significant crop damage and avoid killing "good" bugs that prey on pests.

"In many cases, we're putting knowledge in place of pesticides in these computer systems," he said. "It requires more knowledge to use pesticides discriminately, and computers are great at assembling the information farmers need to determine when insect pressure is likely to reach a destructive level."

Overall, the results of farmers using AGMAN to decide when, and how, to kill crop pests could be a slowing in the rise of production costs for farmers and a slowing in the rise of food prices for consumers, Croft said.

Getting AGMAN "fully implemented"—so any farmer with access to a microcomputer can use the system — may take 10 years or more, said the scientist, but the service first will be available through county Extension offices. The initial steps for providing that service have already been taken.

The OSU Extension Service has been operating a pilot computer program in Jackson, Umatilla and Marion counties for several months. It involves putting microcomputers in county offices so Extension agents can use them for office management and for sending and receiving information via the computer and telephone lines (in computer jargon, that's called "electronic mail"). Plans call for all Extension offices to be linked in a statewide computer system over the next two or three years.

AGMAN is part of the three-county pilot program, too.

"Through AGMAN, we have access to the latest market information, and we plan to use AGMAN in working with our fruit growers, livestock people and other clients," said Ron Mobley, chairman of the Jackson County Extension Service in Medford.

Several farmers in the Medford area already have expressed interest in purchasing a microcomputer that will be "compatible" with the Extension office's microcomputer so they'll be able to communicate with it via telephone, Mobley added.

"What I'd like to see AGMAN do first is help our farmers with irrigation," said Jerry Prothro, an agent in the Umatilla County Extension office at Hermiston, another participant in the pilot computer program.

AGMAN shows great potential for quickly processing weather data for the semiarid region and calculating potential moisture loss for the day. Farmers could then feed that information into their own microcomputers, along with information about their particular crop conditions, and find out when and how much to irrigate, Prothro said.

As the cost of pumping irrigation water rises, so does interest in precise irrigation, he added.

Mike Gamroth, of the Marion County Extension office, said people in his office have been so busy with chores like entering their mailing lists into the computer that they haven't had much time to use the not-yet-complete AGMAN network.

"But I intend to come in 15 minutes earlier every morning, tie in, and get the farm and livestock market news. That'll be really handy," said Gamroth.

AGMAN isn't the only electronics-related innovation headed toward Oregon farmers.

AGMAN isn't the only electronics-related innovation headed toward Oregon farmers. In January, the OSU Extension Service plans to begin operating a new farm market information service in cooperation with the Oregon Public Broadcasting System.

The service will allow persons who buy a special decoding device to receive up-to-the-minute farm market news (in the form of writing on the television screen) on OPBS's four television stations. The market news will be on what's called "Line 21," a line on all television screens normally not seen by viewers.

The decoding devices, which cost $250 to $300, allow viewers to expand the line so it is visible and covers the middle of the screen.

"We're looking at some new mass technology here via computer — AGMAN is where we'll get the market information—that will give people in agriculture access to current market information from 8 a.m. until 11 p.m.," said Carl O'Connor, an OSU agricultural economist who works for the Extension Service and the Experiment Station.

Conceivably, O'Connor said, Oregonians will be able to press a button on their decoder and get farm market news on the middle of their television screen while occasionally peeking at "Seasame Street," still playing on the outer edges.

O'Connor and Gene Nelson, head of OSU's agricultural and resource economics department, are among many working to develop the Line 21 service. Steve Reed, coordinator of OSU's marketing news service, will manage the new service.

Most states disseminate market news through their state agriculture departments, but Oregon law assigns the job to OSU, O'Connor noted. For years, OSU has transmitted marketing information to the public with a noon radio show and weekly, written summaries sent to electronic and print media.

Soon, the Extension Service plans to begin advertising the Line 21 market news service in preparation for the January start-up, O'Connor said. In 1984, the computer and AGMAN pilot program will expand to "eight to 10" county Extension offices, he added.

Move over, Pac-Man. ■

OSU entomologist Brian Croft, left, and computer scientist Kevin Currans place a cartridge containing a disk similar to a phonograph record into the PDP 11/34 minicomputer that is the central "brain" of OSU's new AGMAN electronic information network. Data are stored on the "hard disk" (a computer term for the coated aluminium plate), and a backup system of "soft, or floppy, disks" can store data, too. A private firm is donating a minicomputer for use with AGMAN that has six times the storage capacity of the one pictured. An even larger computer will be needed for the system when Oregon farmers with microcomputers are given direct access to it, says Croft.

research notes

Disappearing pheasants

An OSU researcher is using radio tracking devices on pheasants to find out why so many of them do not survive after springtime release in the Willamette Valley.

Tom Haensly, wildlife graduate student, has been studying pheasants obtained from the Oregon Department of Fish and Wildlife to learn how to keep them alive. In 1980, Haensly released and radio-monitored hens and found results were similar to earlier studies—survival was less than 2 percent.

In 1982, Haensly released 176 birds; 136 died from predators, primarily the red-tailed hawk and the red fox, and possibly the Cooper's hawk, the sharp-shinned hawk and the great-horned owl.

"There were a few coyote kills," said Haensly. "The bulk of birds killed by predators die within three weeks after release. This primarily shows that birds unfamiliar with surroundings and raised in captivity are basically less wary. The longer the bird was in the wild, the greater its chances of survival."

Eighty-two nests were started, he said, and 35 (43 percent) hatched.

"Thirteen nests (16 percent) were abandoned, 20 (24 percent) were struck by predators, seven (9 percent) were lost to farming operations and seven (9 percent) were lost because the hen died for one reason or another," said Haensly.

He found that birds released later in the season seemed to have a better survival chance, probably because more cover is available. In an April 11 release, there was 8 percent survival. From an April 29 release, 13 percent survived. From a May 17 release, 27 percent survived.

The birds preferred to nest in fence rows and other strips, places that were five times more likely to be raided by predators than nests in other habitats, he said.

In April and May this year, Haensly released 140 birds in the same study areas, the Basket Slough National Wildlife Refuge north of Dallas and the Luckiamute River area south of Monmouth. These birds, too, carried radio tracking devices.

Information from the 1983 tests will not be available until later this fall, Haensly said. The information should help state wildlife officials manage pheasants in the Willamette Valley.

Each fall, the ODFW, which produces all its pheasants at the E. E. Wilson Game Farm near Corvallis, releases about 18,000 of the birds. It also distributes up to 15,000 chicks annually to cooperating researchers with the agreement that at least half the survivors are to be released. ■

Fisheries and wildlife researcher Tom Haensly with a pheasant hen.

TB in salmon

Tuberculosis, once the most widespread, destructive disease known to humankind, has been practically eliminated from many human and animal populations. But OSU microbiologists have found a form of the disease—thought no longer in the Northwest — in Oregon's Pacific salmon.

There's a major difference, however, between the organism causing the disease in salmon and the one that infects man. The type of bacteria infecting salmon cannot live in warm-blooded animals, said John Fryer, an Experiment Station microbiologist who studies fish diseases.

Cindy Arakawa, a graduate student working in Fryer's laboratory, has identified the organism as a subspecies of a large group of bacteria that can cause infections in man and other animals.

According to Arakawa and Fryer, a similar organism, but not the same organism, was responsible for an outbreak of fish tuberculosis in the West in the late 1950s and early 1960s. At that epidemic's height, TB was found in salmon from California to Alaska and up to 90 percent of the salmon returning to Columbia River Basin hatcheries were infected. Since then, the organism has become rare.

"It was really kind of a shock to find this bacterium," said Fryer, who last isolated the organism in 1964 (from an Oregon cutthroat trout). "We just didn't know it was around anymore."

Arakawa has found the disease in fish in several Oregon hatcheries. But, say the scientists, tuberculosis in fish or in other animals does not cause the explosive type of mortality often associated with epidemics.

Although there have been no studies of how many fish die of tuberculosis after they leave hatcheries and enter the ocean, the researchers believe the number may be "significant."

"We really don't know where the organism came from," said Fryer, "and we don't know how it persists in the population." ■

profile

She studied chemistry as the bombs exploded

Te May Ching

As a young person growing up in China, Te May Ching "wanted to contribute to the world." Now, as an OSU seed physiologist, the tennis-playing grandparent of two is doing just that.

"I'm trying to improve cereal seeds and provide the best ones for food," says Ching. "There are so many suffering and starving people in the world. I want everybody to have enough to eat, at least. That's my major goal in life."

During the post-World War II Communist revolution in China, a time when "everybody didn't have enough to eat," Ching completed a hectic undergraduate program in wood chemistry at the National Central University in Nanking.

Because of frequent air raids, says Ching, much of the spring and fall semesters was spent scurrying from classrooms to bomb shelters. There, instead of wasting time, professors would continue lecturing during bombings. But in the confusion, they didn't always start where they left off, she recalls, laughing.

In 1948, Ching followed her American-born husband (who had been stranded in China by the war) to Michigan State University, where both earned master's and doctoral degrees by 1956.

"It took us about eight years to finish because in the meantime we had two children," says Ching, who received her degree in cytogenetics (cell genetics). "But we really worked hard, studied hard, and finally got our degrees at the same time."

Then, because her husband was hired as a Bureau of Land Management forester in Portland, Ching came west. Things were "really booming" at OSU then, she says. So she applied for a research job with the OSU crop science department's seed lab and was hired immediately.

Now, 27 years and about 150 research publications later, she's still enthusiastic about her work in seed physiology.

"Every time I find something new, I'm still happy," she says, "because even though it's a very small thing, it's mine. I think it's important to accomplish something nobody else has accomplished or even thought of. That's success to me."

Currently, most of her research deals with triticale, a cross between wheat and rye that is more nutritious than wheat and as hardy as rye.

"Triticale looks like a good cereal," she says, "but the problem is that (some of) the seeds are shriveled."

Shriveled seeds have less starch and lower productivity than plump seeds. And, because cereal is a staple food, Ching is determined to find a solution to the problem caused by shriveling.

"It's our responsibility to produce more (food) to feed the world," she says, "and that's what we're anxious to do."

Regardless of what the future brings, however, Te May Ching says she'll "never have regrets," because that would be a waste of time.

"If you want to achieve something, you just have to work at it," she says. "If you just talk about it and think about it, it won't help you. Even though you make mistakes, you will still learn—you will become wiser and more capable. I think the mind is not as much of a limitation as your willingness is." ■

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