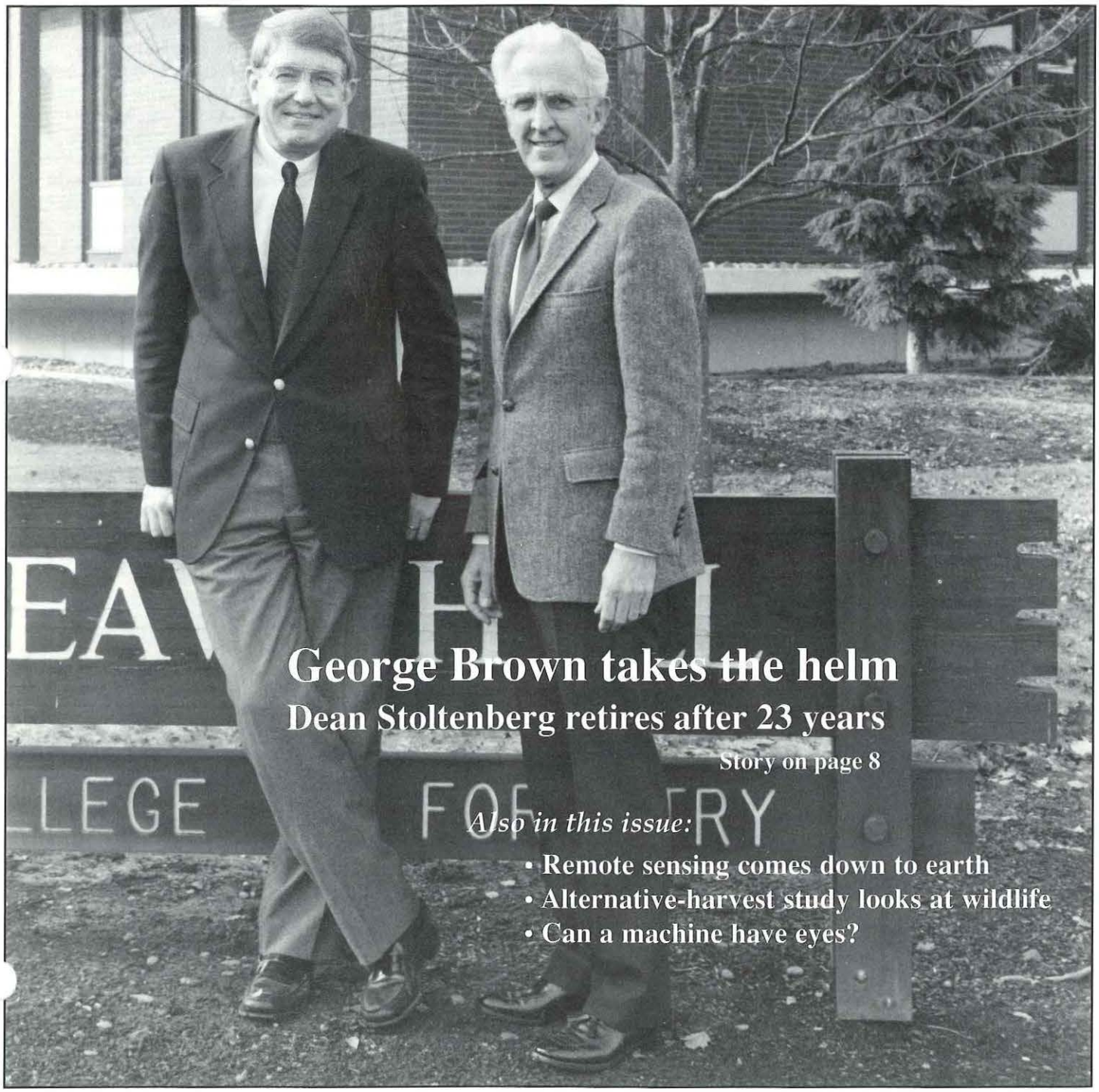
focus on forestry

at Oregon State University

Winter 1990



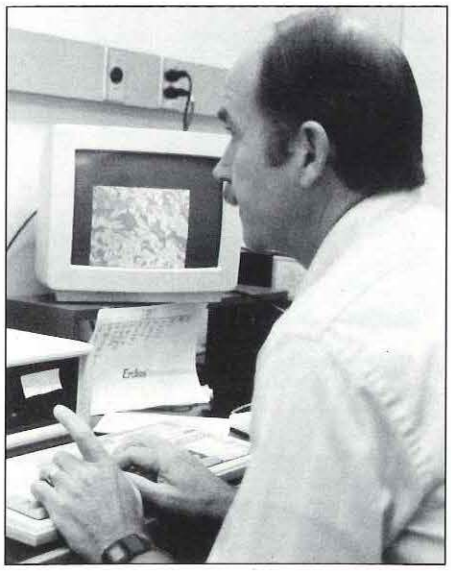
George Brown takes the helm

Dean Stoltenberg retires after 23 years

Story on page 8

Also in this issue:

- Remote sensing comes down to earth
- Alternative-harvest study looks at wildlife
- Can a machine have eyes?



ERSAL researcher Dennis Isaacson at the computer. Story on page 3.

focus on forestry

Winter 1990
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College of Forestry
Oregon State University

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from the Dean

Winter 1990

Let me begin my first Dean's Column by telling you how honored I am to have been selected to serve as dean of the College of Forestry. It is an awesome responsibility, but an exciting one, given the issues we face in forestry and the outstanding faculty, staff, and alumni support we have to meet those challenges.

The coming decade will be a challenging one for the College and for forestry in the Pacific Northwest. My vision for the College in the next decade is that we will become an intellectual center for forestry in the West, a generator and catalyst for new ideas in forestry, and a voice for the ethical context of our profession. To fulfill this vision, we must strengthen our position as a key source of relevant, reliable, and unbiased information about forests. We want people to turn to the College for factual information, and that includes decision makers in government and industry as well as members of the public and the environmental community. We must also be in touch with a broader array of clients to help us sense emerging issues, so that we can help shape the future. And we need to be more active as participants in the public debate.

In his tenure as dean, Carl Stoltenberg has guided the College through booms and recessions. He has molded an organization with strong programs in teaching, research, continuing education, and extension. He has positioned us to enter this challenging decade with strength and confidence. I hope you'll eagerly join us as we tackle the challenges of the 1990s. Indeed, it has been the support from outside the College—from alumni, industry, the congressional delegation, legislators, and others—that has made us what we are today.

I look forward to this next decade with great anticipation and to the opportunity to work with you in serving Oregon and its people.

George Brown

George Brown
Dean, College of Forestry
Oregon State University

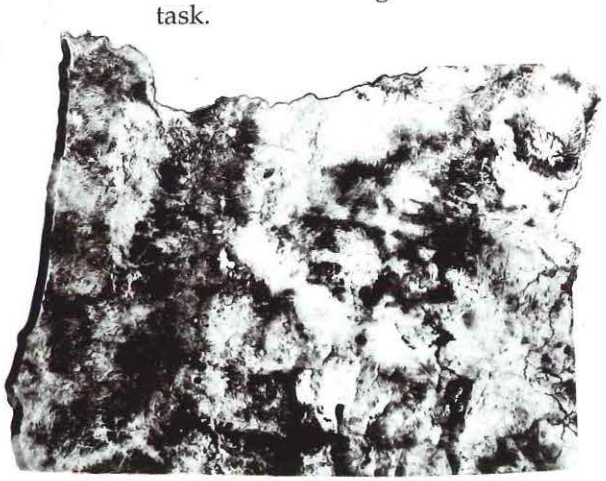
THE BIG PICTURE

ERSAL paints a portrait of the landscape in light

Central Oregon's Warm Springs Indian Reservation covers 650,000 acres of highly varied landscape—mature timberlands, young and middle-aged managed forests, grassy rangelands, and high deserts of juniper and sagebrush.

To manage a land of such diversity is a challenge. But wildlife manager Terry Luther has a good handle on his part of the job, thanks to Oregon State University's ERSAL.

ERSAL's real name is Environmental Remote Sensing Applications Laboratory. Remote sensing, says William J. Ripple, director of ERSAL, deals with the patterns of light reflected from the Earth's landscapes and detected by sensors mounted on satellites and aircraft.



A composite image of Oregon, from data gathered by NASA's Landsat satellite.

Since 1972, when it was born out of a grant from NASA, ERSAL has been finding ways to refine the raw data collected by remote-sensing instruments into formulas to help foresters and other land managers make better decisions. "We conduct research to find out what we can see with satellite data," says Ripple—he's also assistant professor of forest resources—"and what we can do to turn it into useful information."

ERSAL's information proved very useful to Terry Luther. As fish and wildlife biologist for the Confederated Tribes of the Warm Springs Indian Reservation, Luther is responsible for the health of the elk and deer populations on the reservation.

Among other things, these large game animals need both open areas in which to forage for food and forested areas to protect them from the elements. These forested areas are called thermal cover.

Luther had a pretty good idea of the state of the large-game habitat on the reservation. But he wanted more-precise information.

"We are at a point in our timber management," he says, "where we need to know how much thermal cover we have, because that is typically what's being harvested." To gather such information from the ground—650,000 acres of it—would have been a formidably time-consuming task.

Instead, in 1985 the Warm Springs tribes got in touch with ERSAL.

Eye in the sky

ERSAL gets its remote-sensing information from NASA. It's gathered by sensors mounted on the Landsat satellites, in orbit more than 500 miles away in space; or on such aircraft as the high-flying U-2 plane, which surveys the Earth from 12 miles up. The sensors record the patterns of light waves reflected from the landscape and store them as numbers on a magnetic tape.

The Warm Springs data were collected by Landsat. ERSAL processed the numbers and printed out a map of the imaged reservation. Fifty-eight different types of landscape features, corresponding to 58 different patterns of reflected light, were plotted on the map.

The information was also presented to Luther on magnetic tape so that he could manage the data on his own computing system. With some fieldwork, Luther and his colleagues were able to verify ERSAL's code and translate it into a highly detailed and accurate map of the different types of vegetation that were of interest to them.

Now Luther knows exactly how much thermal cover there is on the reservation, and where it lies. ERSAL's work, he says, adds a valuable tool to his kit.

ERSAL's main focus now is on wildlife habitat. With a three-year, $496,000 grant from NASA, ERSAL's scientists, collaborators, and graduate students are developing remote sensing to study such things as the harvest-induced fragmentation of Douglas-fir forests in the Oregon Cascades, and the light patterns that characterize the habitat of the northern spotted owl.

To Dennis Isaacson, remote-sensing specialist at ERSAL, such studies are essential to prudent forest management. "I like to draw a parallel between European forests and ours in Oregon," he says. "In Europe, the transition from natural to managed forests took place over three millenia. In western North America it's taking place over less than a hundred years. It only makes sense that we use every bit of information available. These systems can help guide us into a completely managed landscape, and that's what's in our future."

Not to use such tools, he says, "is like driving a car with your eyes shut."

Timber harvest and wildlife: A new study brings them together

Clearcutting may be the most efficient way to grow and harvest timber, but certain wildlife species suffer when their habitat is lost. A new, large-scale study on the College's McDonald Research Forest is looking at ways to harvest and replant timber without eliminating wildlife species that live in mature forests.

Findings of the study could ultimately be applied in the form of timber harvest plans that win support rather than censure from the environmental community. More immediately, the study should yield valuable information about how Douglas-fir seedlings perform in areas where some big trees are left, and how the big trees respond when their neighbors are cut down.

A McGillivray's warbler is cradled in a human hand. The bird is one of more than 50 species of birds and mammals observed in the McDonald Forest wildlife study.

The experiment will thus be a good teaching tool, says John Tappeiner, professor, silviculturist, and one of the study's two principal investigators: "It'll be something that both students and the public can come and look at."

Because clearcutting is uncomplicated and cost-effective, says Tappeiner, it has been the customary and preferred method of harvesting and regenerating Douglas-fir. Clearcutting can also be beneficial for some wildlife, notably deer and elk, because it increases their food supply.

Certain smaller animals benefit too, says wildlife biologist Bill McComb, associate professor and Tappeiner's partner in the research. "A whole host of nongame birds and several small mammals are colonizers—they move into a clearcut and reproduce rapidly." But other small birds and mammals, such as woodpeckers, hermit warblers, brown creepers, and red-backed voles, aren't adapted to rapid movement and reproduction.

"We know that if we clear-cut," McComb says, "it's going to be a long time before that mature forest comes back again. Our goal is to try techniques where some mature forest is left on site, either as scattered trees or as pockets of mature timber."

The study involves 33 stands of 15-20 acres each. They will be harvested under three general regimes: clearcutting, selective cutting to produce a two-storied stand, and harvesting of small patches within a stand. One stand will be left as a control.

Snags will be left on each of the treatment stands. They will be clumped together on some and scattered on others, to see which arrangement is preferred by cavity-nesting animals. Some of the snags will be natural; others will be created by using dynamite to blow the tops from living trees.

The study, covering about 500 acres, is the largest and the first ever of its kind to be carried out on the 7,000-acre McDonald Forest. It had its roots in an annual short course in wildlife and silviculture, developed by Tappeiner and McComb and taught for the first time last May to forest agency managers. Information gained from the study will be part of the continuing curriculum of the course.

The researchers began the experiment by identifying the study stands and taking stock of the animals living there. McComb and two graduate students counted more than 50 species of birds and small mammals. The mammals were trapped and released; the birds had to be identified by their calls. This kind of wildlife inventory, says McComb, takes a keen ear. "You might hear three Wilson's warblers all at once—one 20 feet away in one direction, another 40 feet the other way, and the third one back behind you. And there may be 15 other species all singing at the same time." The wildlife will be counted again each spring. Changes in the composition of the animal community will be noted and

compared among the different stands.

The experiment will study not only wildlife but reforestation methods, and perhaps nail down—or revise—conventional wisdom about regenerating Douglas-fir forests. For example: "We know Douglas-fir does well in openings," says Tappeiner. "We'd like to find out how big an opening is needed. In the two-storied stands and the small openings, we can study how the remaining trees affect the regrowth of the seedlings, and the regrowth of native hardwoods and shrubs as well."

The study is projected to last through June of 1999, but Tappeiner and McComb would like to carry it beyond that date. They believe the study can contribute significantly to the knowledge of Douglas-fir regeneration and the impact of logging on wildlife. "Twenty years ago," Tappeiner says, "our ability to regenerate clearcuts was less successful than it is today. Now we know how to do that; we've got a system that works. I think that's a big accomplishment, but we can't rest on our laurels. We need to try something different; to achieve some simple alternatives."

'We know that if we clear-cut, it's going to be a long time before it comes back again. Our goal is to try techniques where some mature forest is left on site.'

Some neighbors opposed to Mac Forest study

The College of Forestry's silvicultural-alternatives study was met with protests in mid-August when neighbors of McDonald Forest learned that cutting was about to begin on the first harvest unit just west of Lewisburg Saddle.

Bill Atkinson, director of OSU Research Forests, and manager Jeff Garver met with about 40 neighbors to discuss their concerns.

The meeting helped defuse some objections, says Atkinson, at least for now. "Many of them," he says, "appreciated the nature of the research when it was explained to them."

'Throw bricks at us for a clearcut that you don't like, but throw roses at us for preserving stands of old growth.'

It's understandable, say College officials, that people who live next to a serene setting like the McDonald Forest would prefer that it remain untouched. But that's not in keeping with the mission of a research forest, which is to provide a place where various management alternatives, including ways of harvesting timber, can be tried.

Atkinson stresses, however, that the College's research mission embraces the whole ecosystem—including the human component of it. "We are trying to show," he says, "that multiple-use management is a real, workable thing—that with careful planning you can harvest timber and still have recreation, water, wildlife, all the other resources."

This isn't the first time the College has fielded protests from Mac Forest neighbors. There was an outcry in 1988 when 55 acres just adjacent to the road on Lewisburg Saddle were harvested.

Responding to protests from the public, Atkinson, in a 1988 issue of the College's student newsletter, *Hi-Lead*, wrote: "If I were able to say one thing to these critics, it would be: 'Hey—look at our entire operation and not just the part of it you disagree with. Throw bricks at us for a clearcut that you don't like, but at the same time throw roses at us for preserving stands of old growth, for continuously expanding our trail system, for providing a training ground for thousands of foresters and research sites for hundreds of important projects.'"

Research forest director Atkinson

Some of the other resources that the College is developing right now, Atkinson says, include a trail for elderly and handicapped visitors near Peavy Arboretum, a autobicycle historic tour of the Soap Creek Valley, and an old-growth trail.

"There will probably always be people who object to some things," Atkinson says. "We won't be able to please everybody. But when people come to realize the variety of things we do here, I think most of them will support us."

Teaching the machine to see

Imagine—just for the sake of futurist fantasizing—a scientific instrument for visual perception, a "seeing machine," if you will. Imagine that this instrument is so finely tuned that it can pick out, say, a tiny split or a subtle pitch streak that is barely distinguishable from the grain of the wood nearby.

Such a thing exists today, but it's not a scientific instrument. It's the human eye and brain, which work together to perform an astonishing series of complex, rapid, and largely intuitive judgments. "If a machine could see as well as a 3-year-old," says David Butler, "our research would be years ahead of where it is."

Butler, operations researcher and mathematician, is one of three leaders of a Forest Products team researching machine vision—a complex and cutting-edge field of study that aims to find ways to teach computers to "see," with the aid of video cameras, some of the same things that humans can see, and to make some of the judgments that humans now make based on what they see.

Butler, associate professor of statistics, and co-leaders James Funck and Charles Brunner, associate and assistant professors (respectively) of forest products, are finding ways to use machine vision to do such things as locate defects in sheets of veneer, make less-conspicuous joints in wood products, and devise the most efficient way to saw a board.

For example, one study, led by Funck, used a camera to record how ribbons of veneer were clipped into sheets at a particular mill. Funck then digitized the pictures, manipulated the digitized images, and reconstructed the clipping process. This made it possible for him to try various clipping schemes to find the most efficient one. Using this information, the study found, a typical mill could increase its recovery of good veneer by up to 9 percent.

Machine vision is used to some degree in mills already, but its capabilities, while promising, are far inferior to those of the human eye. For instance, the scanner can identify open holes but not closed defects. "The process must be made sensitive enough to recognize defects of all sizes, shapes, and colors," says Funck.

'The capability of the human eye is quite phenomenal.'

Charles Brunner (left) and David Butler confer as they work at the terminal of a new, $30,000 machine-vision instrument called a spectro-radiometer.

Here is where it's hard to explain to people that machine vision is more than meets the eye. Says Butler: "A person on the production line says, 'I can see that defect—how come the machine can't see it?'"

The answer is that most people don't realize how remarkable their own vision is. "The capability of the human eye," says Brunner, "is quite phenomenal compared to that of a machine-vision system. When a person sees, it's a virtually instantaneous event: You see the *gestalt*, the whole field." Machine vision, on the other hand, must work with one tiny, specific piece of information at a time. So to try to understand it in human terms can be misleading. "We are trying to get computers to achieve *some* of the same kinds of performance that a human can achieve," says Butler, "but typically our techniques are totally different. We use methods that are suited to what a computer can do, rather than what a human can do; we don't have a computer that 'sees' in a human way."

With further refinement of the computer's eye comes more potential applications: For example, in furniture and millwork joinery, where subtle likenesses in the grain and color of wood could be matched so smoothly as almost—perhaps—to fool the human eye. Machine vision could make it possible to get high-quality finish work out of smaller, less-expensive pieces of clear wood.

"I think we've been successful in combining the talents of people with quite different backgrounds," says Butler. Among the research assistants and graduate students working on the project are people with degrees in computer science, electrical engineering, mathematics, and statistics, as well as forest products. "So this is really quite an interdisciplinary approach."

"It took us a while to get up to speed," says Brunner, "but I think we now have a critical mass of talent. In the next 10-15 years there will be a large increase in the use of machine-vision systems, and we feel our research can make a significant contribution to their application in the wood-products industry." ■

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Involved, engaged, outspoken

That's the College of Forestry—and its new dean

In assuming the deanship of the Oregon State University College of Forestry, George Brown acknowledges he's stepping into some big shoes. How do you affirm both your own vision for the future and the contributions of your well-respected and highly effective predecessor? How, in short, do you follow an act like Carl Stoltenberg's?

In fact, says Brown, who has worked in close partnership with Stoltenberg as a member of the College of Forestry's administrative team, his own leadership will be in many ways an organic outgrowth of the legacy that Stoltenberg has already established: A College that is esteemed by its peers, involved in forestry policy issues, engaged at the cutting edge of research, and committed to transferring its knowledge to the public that supports it.

George Brown: "It's time to light the fuse."

'This is not your classic ivory-tower forestry school. We're in the thick of things.'

"This is not your classic ivory-tower forestry school," says Brown. "People here are involved in trying to solve the forestry problems in the state. Our blending of the theoretical and the applied sets us apart—we're in the thick of things."

The College is thus poised to assume an even more influential posture, Brown believes. "We should be an intellectual Mecca for forestry in the West. I know that sounds a little bit presumptuous," he says thoughtfully, "but what I mean is, we should be a place where people turn for new ideas, a place where they come to find an open forum to debate those ideas, to argue them, to test them out. I want us to be considered a source for good, hard, factual, unbiased information on the forest system and how it influences the quality of life in Oregon."

Such a haven for forestry learning is needed now more than ever, he believes, because of the often-acrimonious atmosphere in which forestry and land-management questions are debated. "We need to have a regular place where people can come to understand what we know and don't know about how forests function. And I mean the interaction of *all* values—wildlife, water quality, aesthetics, spiritual values.

"Our role is to conduct careful research and analysis and then, as an educational institution, provide an opportunity for the open interchange of ideas, clearly acknowledging the wide array of perspectives and uncertainties typical of natural-resource issues. This is the classical role of higher education and one universities have played for centuries."

What will it take to turn Brown's vision into reality? For one thing, an aggressive engagement in the natural-resources policy arena. The College, he says, needs to take the first step toward such involvement: "We need to be there and tell what we know. We need to get into the system *before* decisions are made; we shouldn't wait to be invited."

Another item on Brown's agenda is to build bridges—and mend fences—with the environmental community, a constituency that has in the past been "highly suspicious of us, because they haven't liked some of our answers." The College needs to counter that hostility, he says, with a climate of open intellectual exchange.

Finally, the College needs to reach out to the public. "There is an awful lot of misunderstanding," says Brown, "of how the forest-products industry and the natural resources of the state influence the economy of local communities. I'd like to have more basic public education on the linkages between our natural resources and the economic well-being of communities."

It is because of Stoltenberg's painstaking preparation, Brown believes, that the College is now poised to assume a larger place in Oregon's natural-resources consciousness. "He's positioned us to do that. He's put us on the launch pad—now it's time to light the fuse. Our message is, 'We're prepared to move into the next decade with strength.'"

Brown is aware that a high profile isn't always compatible with a solid, unbiased credibility. "There's a great deal of risk involved. There'll be pressures from all sides. People won't always like us. We have to be in the eye of the hurricane." But the College is uniquely qualified to be a voice for responsible stewardship in the management of natural resources, and that, Brown asserts, makes the risks worthwhile.

"Here at Oregon State," he says, "we are sensitive both to the needs of

people and to the environment they live in. That is the classic conservation ethic, and that's why I've stayed at Oregon State. If in my tenure as dean I can bring about a reconciliation of what are perceived as two diametrically opposed and mutually exclusive points of view, then I will have felt my effort to be worthwhile.

"This College is uniquely positioned to provide that reconciliation."

Brown is a forest hydrologist and professor in the Forest Engineering Department. He's been on the OSU faculty since 1966, teaching and doing research in watershed management and water quality and serving as department head from 1973-1986. He was watershed management consultant to the Weyerhaeuser Co. while on sabbatical in 1973.

He earned his bachelor's in forest management at Colorado State University in 1960, his master's in watershed management at CSU in 1962, and his doctorate in forest hydrology at OSU in 1967.

Three years ago Brown became associate dean for research. He was appointed dean of the College, after a nationwide search, on January 1 of this year.

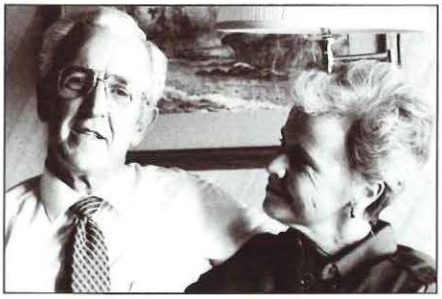
He is a member of SAF, the American Geophysical Union, the forestry honorary Xi Sigma Pi and Sigma Xi, and the American Association for the Advancement of Science. He has published widely in professional journals.

Retirement: just a change of opportunities for Stoltenberg

In Carl Stoltenberg's measured and articulate conversation, one word recurs with a frequency that is far from accidental. That word is "opportunities," and it can be read as an index into Stoltenberg's world view, a clue about how he organizes and measures the vicissitudes of his life.

That life—a life full of accomplishments—is undergoing some particular scrutiny now that Stoltenberg has turned over the helm of the College of Forestry to his successor, George Brown. "My opportunities as dean of the College of Forestry were one thing; those I have as a private individual are quite different," he says. "I'm rethinking my way of looking at the world, rethinking what my opportunities are now.

"I'm going to do some thinking and reading about the issues that the community and the nation are facing, and some reflecting on where I fit into them. What role can I play? Forestry may be a part of that role, but not all—maybe not even the major part."



Carl and Rosemary Stoltenberg enjoy a relaxed moment at home.

Forestry has played a major part in Stoltenberg's life for a long time, beginning back when he was a boy growing up on California's Monterey Peninsula. He went on to earn a forestry degree from Berkeley in 1948, a master's in forestry economics in 1949, and a Ph.D. in resource economics from the University of Minnesota in 1952. He was attracted to resource economics because "I was interested in both people and resources, and economics provided a way to work with the interaction between the two."

When he became forestry dean at OSU in 1967, Stoltenberg knew he was stepping into a large arena. OSU, he says, was and is "*the* place of opportunity for education and research, the place from which one can make more of a difference in forestry, locally, nationally, and internationally, than perhaps any other place in the world."

His accomplishments as dean are many. Stoltenberg—characteristically—talks about them as "opportunities"—opportunities to do the job at hand and to build upon the work of his predecessors.

"When I came, the opportunities that existed immediately were to provide greater integration and coordination of the different missions the College had: to coordinate undergraduate, graduate, and continuing education, to integrate research, and to bring in forestry extension. And I think we've done a reasonably good job of that."

"Classic Stoltenberg understatement!" says George Brown. "In his tenure as dean, our teaching program has profited from his emphasis on development of faculty as teachers, our research program has doubled in size, our continuing-education program has mushroomed, and we have the largest forestry extension program in the nation. The College has moved from a reputation as a good, solid forestry program to one of the very best forestry schools in the United States. Yeah, I'd say that's a 'reasonably good' job!"

For the next several months Stoltenberg and his wife Rosemary are looking forward to traveling and reading. After that "the picture is much less clear," Stoltenberg says with a smile.

"I've had 23 years of fantastic opportunities at Oregon State. They have really been wonderful for me! But now it's time to move on."

forestry currents

Yoder receives NASA fellowship

Barbara Yoder, a doctoral student in forest science, has received an $18,000 fellowship from NASA for 1989-90. The fellowship, one of 40 awarded annually by NASA headquarters, will support Yoder in her research on the relationship between

Barbara Yoder

the photosynthesis of leaves and canopies and their capacity to reflect sunlight. Her studies are part of a larger research effort in remote sensing—monitoring the health of forests from aircraft or satellites.

In carefully controlled laboratory studies, Yoder will be measuring the light that is reflected both from individual leaves and from tiny greenhouse forest canopies no bigger than 15 inches square. She will use this information to test some specific hypotheses about how photosynthesis—the plants' food-making capacity—is related to the amount and kind of light reflected.

Yoder's research is part of a larger study called OTTER—Oregon Transect Terrestrial Ecosystem Research—which is also supported by NASA. OTTER researchers hope to perfect methods of monitoring the health of entire forest ecosystems from aircraft or satellites.

OSU Forest Science professor Richard Waring is head of the program in Oregon and also is Yoder's major professor. The fellowship also covers tuition and travel expenses for Yoder and Waring to attend a symposium in Washington, D.C., in May of 1990.

Resler honored at SAF convention in Spokane

Rexford A. Resler, '53 and '54, was honored with the Gifford Pinchot Medal at the 1989 SAF National Convention, held last September in Spokane, Wash.

The highly regarded award is presented by SAF every two years to recognize outstanding contributions by a forestry professional to the administration, practice, and professional development of North American forestry. The award and accompanying engraved medallion commemorate Gifford Pinchot (1865-1946), founder and first president of SAF.

Resler earned his bachelor's degree from OSU in 1953 and his master's in 1954. He was active in the Forestry Club and led the crew that completed the Forestry Cabin in Peavy Arboretum.

He began his career with the Forest Service in 1953, serving as district ranger on the Siuslaw and then the Rogue River National Forests. He later became deputy regional forester in the Pacific Northwest. He was appointed associate chief of the Forest Service in Washington, D.C. in 1972. He retired from federal service in 1979, but went on to become executive vice president of the American Forestry Association, a position he held until 1984.

Rex Resler

Resler was honored for his contributions to the development of the National Forest resource and land-management legislation. Particularly noted was his work with Congress in clarifying controversial forest-resource bills.

In his writing and public speaking, Resler continues to be an articulate spokesman on national forestry issues. He has appeared on many forest-policy discussion platforms nationwide.

Resler and his wife Lee raise Missouri Foxtrotter horses on their five acres near Terrebonne, Oregon.

Forestry enrollment: It's on a roll

The College of Forestry is bigger by 87 students—80 more undergraduates and seven more graduate students than last fall, according to Perry Brown, associate dean for instruction.

The numbers spell an enrollment increase of 25 percent overall and 35

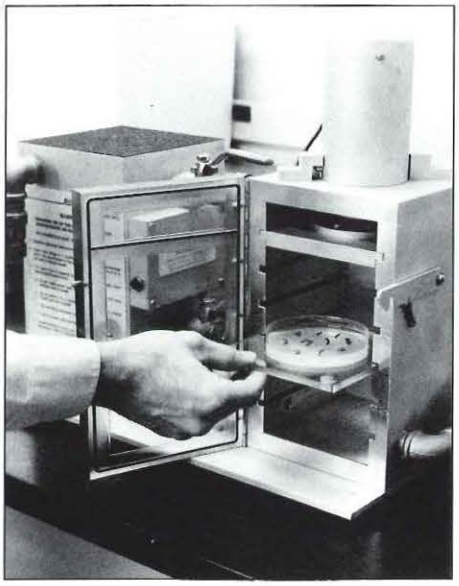
percent for undergraduates.

The increase is reflected in most programs: Forest Products is up 33 percent for both undergraduate and graduate students; Forest Resources, 31 percent; and Forest Engineering, 19 percent. Forest Science is slightly down. Total enrollment is 306 undergraduates and 130 graduates.

"I believe this is the biggest percent increase we've ever had," says Brown.

Donor hits the target with new gene gun

Thanks to the generosity of an anonymous donor, the Forest Science Department's gene-research effort has its own gene gun—and it's literally a gun, says Steven H. Strauss,



Forest Science's new gene gun

assistant professor and geneticist. The new machine uses .22-caliber shells to propel tiny particles of tungsten loaded with foreign genes into the cells of young Douglas-fir needles.

Strauss uses the gene gun to bombard Douglas-fir cotyledons with genes from the bacterium *Bacillus thuringiensis* (B.t.). Those that accept the foreign genes are cloned—propagated by means of tissue culture—and then rooted. "If everything worked," says Strauss, "all the cells within our genetically modified shoots will have the new genetic information."

B.t. is a bacterium that is also an insecticide. It's used in sprays to control many insects including gypsy moth caterpillars, which can be very harmful to Douglas-fir. Ultimately researchers hope to produce Douglas-fir seed stock with genetic resistance to the gypsy moth.

The $30,000 gene gun is actually leased rather than purchased, so that it can be replaced periodically with an updated model. Half the lease fee was donated by a College of Forestry alumnus who prefers to remain anonymous. The rest comes from National Science Foundation matching funds given in connection with Strauss' Presidential Young Investigator award.

The gene gun has attracted the interest of other gene researchers here, particularly those studying botany, agricultural chemistry, crop science, and horticulture. Says Strauss: "I imagine this machine is going to get quite a lot of use on this campus."

How much timber is out there? Experts offer projections

Timber harvest in Oregon over the next decade will probably fall below what was cut in the late 1980s, says a team of experts that includes four OSU professors. That decline will be felt unevenly over the various timber-producing regions of the state, but the statewide impact won't be enough to halt or reverse Oregon's current economic growth.

And over the long haul, harvested trees will get smaller, clear-cut acreage will stay about the same, and, barring catastrophe, we'll have old-growth forests indefinitely.

These and other projections about Oregon's timber availability over the next 100 years were offered by a team of public and private timber experts at the third Starker Lecture last November.

Members of the team were John Sessions and Brian Greber of the College faculty, K. Norman Johnson of the College faculty and the governor's staff, John Beuter, former associate dean at the College of Forestry and now an adjunct faculty member and a private forestry consultant, and Gary Lettman of the Oregon Department of Forestry.

Beuter and Johnson were two of the authors of a 1976 timber-availability report titled "Timber for Oregon's Tomorrow," widely known as the Beuter Report.

Like the 1976 report, the 1989 update looked at the availability of timber on federal, state, and private industry and nonindustry lands, and calculated the effects on the economy based on a number of scenarios. Other projections:

We've recently been cutting more than we can sustain on the current land base, but not by much: Only about 5 to 10 percent, say the researchers. Sustainable harvest can be achieved by the next decade if we wish, at a moderate cost in jobs and income.

However, if this is done, according to the proposed actions of public management plans and the likely actions of private owners, the level of harvest that can be termed "sustainable" could increase, surpassing the level of the recent past, by 2030, and could rise 10-15 percent above that level by 2090.

Moreover, there's room for increasing the sustainable harvest even more by intensifying management, especially on nonindustrial private lands.

The timber-availability report is to be printed and made available to the public by early 1990.

Top Weyerhaeuser executive stays in touch

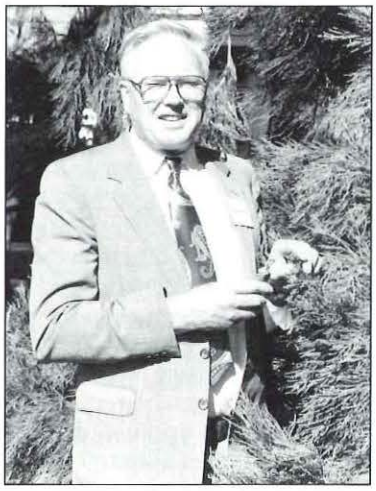
In his senior year of forestry school, Norm Johnson, OSU '55 and '57, just assumed he would go to work for the Forest Service like his dad. But a happy accident intervened. "I'd accepted a job with the Forest Service at Waldport," he says, "starting when I graduated.

"Then one day a professor of mine, Jim Krygier, stopped me in the hall and said, 'Swede (that was my nickname then), you took a couple of courses in entomology, didn't you? Well, Weyerhauser is looking for an entomology assistant for the summer. Why don't you apply?'"

Johnson got the job, and his career changed course in a very fruitful way—for him, for Weyerhaeuser, and for OSU.

Norman E. Johnson's life is full of such fortuitous circumstances. He jokes, "I was a victim of lack of planning," but he does seem blessed with an intuition for work that suits his considerable talents.

Johnson, 56, is vice president for research, engineering, and technology commercialization at Weyerhaeuser. The giant, diversified wood-products company runs the largest private-sector forestry research and engineering program in the world. With responsibility for 700 employees and an annual budget of $70 million, Johnson fits the title conferred upon him by OSU forestry dean George Brown: "He's the 'dean' of corporate research. He has been in the heat of things in the area of research and management; he's been very, very involved on a nationwide basis." Among his many other service involvements, Johnson is a member of OSU's Forest Research Lab Advisory Committee, and chairs the subcommittee that recommends research priorities for the FRL.



His many accomplishments have carried him a long way from his childhood home, Happy Jack logging camp in northern Arizona's high ponderosa-pine country. His father was a forester on the Coconino National Forest, and with three other children in the family there was no money to spare. "I quit school after the eighth grade," says Johnson. "Then for the next year I hung around home and tried to take a few correspondence courses. Finally my father had had enough of this, and he boarded me out to high school in Flagstaff," for there was no further schooling to be had in camp.

Johnson had no educational ambitions past high school graduation, but another lucky happenstance changed his mind. A friend was driving up to register at Arizona State Teachers College (now Northern Arizona University) and asked Johnson to come along for company.

"Well, I stood in line with him. They handed me some papers and I filled them out. They wanted $40; I had $40 on me. That's how I got started in college."

Johnson came to OSU in 1953. Combining full-time work with school, he earned top grades, landed several scholarships, and graduated first in his class in 1955. He holds a master's from OSU and a doctorate in entomology from Berkeley, and has published over 100 articles on entomology and forestry.

Except for two years as professor of entomology at Cornell, Johnson has spent his entire career at Weyerhaeuser. He assumed his present post in January of 1984.

He has kind words to say about OSU College of Forestry. "What makes it world-class, in our mind, is its ability to cooperate not only with external organizations but internally—between schools, between departments. This kind of cooperation is not common at most universities.

"Carl (Stoltenberg) has taken the whole program along in a well-understood direction. You can find better single programs at other universities, but no university that I know of pulls it together as well as OSU does."

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