

# DEPARTMENT NEWS & VIEWS

# 6

DECEMBER 1988

## *Desperate Farmers Sent out the Call*

# Mole Busters to the Rescue

By BILL WICK

One of nature's original plows, the velvet-cloaked mole, is a mobile weed of Northwest lawns, gardens and pastures. Named *Scapanus* (a digging tool) by scientists, moles have been trapped, poisoned, shot, gassed, bombed, drowned, starved and stomped. And still they thrive.

Amateur inventors have spent sleepless nights devising rose-thorn and razor-blade booby traps for these animals—without success. Other mole-bedeveled humans have treated burrows with lye, creosote, stove oil, mothballs, broken glass, gasoline-soaked starch, and human hair—to little avail. Herb-minded gardeners continue to sow castor beans, garlic, and mole plants to drive moles to the neighbors' property, where they go momentarily if at all.

Is a mole worth all this fuss? Or is it, as a Scotsman once said, "simply a moral discipline to the landscape gardener"?

Taxonomists place moles in the order Insectivora, along with shrews, hedgehogs, tenrecs and the gliding cobegos of Borneo. Farmers place them in a different category, especially fog-belt farmers of coastal Oregon and Washington, a region sometimes said to be the Mole Capitol of the World. There, two species occur: the abundant Townsend's mole, measuring a record nine inches in length, and the rare coast mole.

In 1960, mole damage to Tillamook County pastures worsened with the introduction of flail-type grass silage harvesters, and the Pomona Grange asked Oregon State College to send in the troops. The Cooperative Extension Service responded by funding an educational project to teach mole-control techniques. I was hired from the Washington Department of Game to commence the effort. I put together a county-wide advisory group of dairy farmers, a creamery



Bill Wick staffs booth at 1961 Tillamook County Fair.

operator, and other business people, and away we went.

Soon it became apparent that we didn't know enough about the lives of moles. The Agricultural Experiment Station then funded a small research program, beginning in 1961 and continuing for four years. Professor Lee Kuhn was assigned

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# How Many Hills Can Four Moles Build?

2,000 per Acre, Said the Wildlifers; in a Pig's Eye, Said the Farmers

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as the principal investigator. Perhaps never in Oregon history have the taxpayers reaped so much in effort and results for such a small investment.

Lee Kuhn's plans drew interest from several top-notch graduate students. Dick Pedersen (MS '63) arrived in 1961 to conduct a study on the life history and ecology of Townsend's mole. He was followed in 1963 by Dick Giger (MS '65), who began a study of home range, dispersal, homing, and density of Townsend's mole. Bernie Carter (MS '63) and Paul Peloquin (MS '69), while not assigned to the mole studies, spent valuable time on them.

One faithful participant in the Tillamook mole campaign was a 1942 graduate of the Department, Don Dickey, the owner of Oregon Rodent Control Outfitters of Eugene. Don and Lee, in a stroke of midnight genius, created the famous mole hunting licenses that allowed their bearers "to control, hunt, trap, shoot, pursue, kill or stomp one mole, with or without forked antlers or with antlers longer or shorter than the ear."

The stars of these campaigns were, of course, the moles themselves and the Tillamook County farmers who fought them through the years. So many farmers became involved that I can not begin to give them all credit.

One patriarch, John Naegeli, taught us how to locate and dig out mole nests in the spring. Over the years we dug several hundred and augmented scientific knowledge in a quantum leap. Giger learned to mark moles by banding a hind leg with a #6 band or by toenail clipping. Banding the tails, he concluded, is a good way to lose them. His marking studies proved that moles possess keen homing instincts.

Pedersen confirmed that the diet of



(Photo by Bill Wick)

## Flood Fatalities

Dick Giger inspects Tillamook County moles drowned by floodwaters in January, 1964. They were recovered from debris piles.

Townsend's mole consists mainly of earthworms (72 percent), with roots and other vegetation making up the other 28 percent. Nearly one-fifth of the mole stomachs he examined contained "rootballs," which resembled the tightly wound cores of golf balls. It turned out the animals weren't by nature restricted to worms for

protein—Pete often fed his pet moles raw elkburger.

Pedersen determined that the average litter size for Tillamook County moles was three, with one litter produced per year. He also found that, even where molehills hit their record high of

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## Message from the Chairman

Dear Friends and Colleagues,

The holiday season brings renewal of friendships and reunion of families. I hope many of you will take a few moments to renew your ties with the Fisheries and Wildlife family by sending us word of your activities. We value your perspectives and advice, given from vantage points around the world. We also like to hear from you even if you don't have advice, as do the alumni who read *News and Views*—many of them your classmates.

The Department is undergoing changes in its marine fisheries and aquaculture programs. They center around the new Marine Branch of the Agricultural Experiment Station, which is being developed at the Hatfield Marine Science Center in Newport and at the Seafood Lab in Astoria. The 1987 Legislature funded the Marine Branch's first position, in fishery economics, and more positions are anticipated from the 1989 session. Meanwhile, Fisheries and Wildlife faculty already in Newport will transfer their research to the Marine Branch. They will remain Department faculty, however, and will continue to teach at the Marine Science Center.

The Center's director, Lavern Weber, will supervise the branch station. Its charge is to focus attention on the problems of marine fisheries, estuaries, aquaculture and coastal communities.

We are also modifying our teaching program to meet new needs. The faculty decided to offer a Master of Arts in Interdisciplinary Studies (MAIS), with non-thesis as well as thesis options. Students seeking an MAIS take courses in three areas, one of which must be in the humanities. This allows them to pursue a broad range of graduate

studies and concentrate their efforts on social, political, and economic interactions in fisheries and wildlife. We anticipate the MAIS will be especially valuable to resource managers who desire more freedom in choosing their plan of study and designing a non-traditional thesis.

Other interdisciplinary efforts are under way, with Oceanography and Forestry, to take advantage of technologies that will greatly affect our understanding and management of natural resources. These efforts include cooperative work in Extension.

In our curriculum, new undergraduate courses have been proposed by Dan Guthrie ("Nature and the Western Mind") and Bruce Coblenz ("Global Crises in Resource Ecology"). If approved, they will be available for all OSU students as part of the revised baccalaureate core program starting in 1990. We welcome this chance to extend our teaching across campus and influence students in other colleges.

The Christmas season is a time to say thanks for your sustained efforts in the profession of fisheries and wildlife. Many students come to the Department because, somewhere along the way, you gave them role models to emulate. Although we are proud of all of you, I want to give special thanks to the women. Over the past decade, our women graduates have become an integral part of the fish and wildlife profession, and their pioneering efforts have changed the outlook of first-year students. Women no longer ask us whether fisheries and wildlife is an appropriate career; they only want to know how to get a start.

Happy holidays to all of you, and may you have a "kinder and gentler" new year.

—DICK TUBB

## Coastal Moles Subdued

(Continued from page 2)

2,000 per acre, there were never more than four moles in residence. We bet farmers everywhere a steak dinner on that one—and never had to pay off.

Controlling moles, we concluded, required careful technique, perseverance and cooperation. Trapping, poisoning and even shooting had a place in our county-wide control effort. In the home lawn or garden, a well-placed trap or two, if properly tended, usually took care of the problem. In larger pastures, trapping seemed impossible unless you remembered to fight moles, not molehills. Some farmers cleared

entire farms using traps alone. Others used poison to cut back the top end of the population, and a few even resorted to rifles to eliminate moles in the act of reestablishing runway systems.

As the years rolled on to the late 1960s, some of us thought we might actually run out of moles. There was serious talk of establishing a Tillamook Mole Refuge. I'm pleased to note, however, that a 1988 tour of inspection revealed a healthy coastal population. It may even be time for another generation of OSU mole-ologists to take up arms against these remarkable, mobile weeds, who are easily the smoothest operators in Tillamook County.

### NEWS & VIEWS

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# From the Mailbag

By LEE KUHN  
Professor Emeritus

In the good old days, we were the clearing house for all calls related to bird or beast. Whenever local citizens had a problem, they rang the college and were promptly transferred to the Department of Fish & Game Management. "There's a skunk living under our house. Will you please get it out?" "Something is eating our grapes and I think it lives in the garage." "We have bats in our attic. Can you remove them?"

Many a call for help also came from our own campus. Mice in the girls dorm, rats at the poultry farm, gophers digging up the football practice field, roosting pigeons defiling the mens gym, and even a skunk in residence at Wetherford Hall. The latter became famous in the annals of animal calls when **Paul Peloquin** ('66, MS '69) was sent to evict it. By the time Paul arrived, the skunk was entrenched behind the heating ducts. Undeterred, he and the student tenants eventually extricated it—but evidence of the skunk's resistance remained long afterward.

**Ed Wood** ('49) became a hero of sorts when he successfully captured and removed a weasel that had been causing coed panic in the main lounge of the MU.

Then there was **Morrie Naggiar** ('48), who left his pet raccoon (previously captured and removed from a local garage) in the care of grad student **Max Wilcomb** (MS '48) during spring vacation. Morrie returned only to learn that his pet had escaped. A few days later, Max, who was batching at the old South Farm on

Brook Lane, invited Morrie to dinner, with the main course being stuffed roasted raccoon. After Max assured Morrie they weren't eating his pet (which was never seen again), the two of them sat down and dined sumptuously.

Shortly after WWII, many of our wildlife students elected a course called "Study Skin Preparation," taught by Doc Storm, Pat and Charlie Hansen, and others. In their zeal to obtain specimens the students ranged far and wide. It was even reported that the mayor of Corvallis lodged a complaint with the dean after certain students—**Tom Juelson** ('62), **Dave Riley** ('63) and **Russ Earnest** ('62)—were caught running a trap line in the Corvallis city park! Things might not have been so bad but for the discovery of a #4 1/2 Victor (a cougar trap). Even today no cougars have been reported from the park.

A fine letter from **Don Neff** ('51, Ph.D. '63), now retired from the Arizona G/F Research Division and living near Flagstaff. Don says, "Add my congratulations to Charles Warren on his retirement. I had only one course from him, but it was a dandy! He was a damned fine teacher. Fish and Game biology and techniques have gotten wildly more complex and hi-tech in the past 40 years, but I doubt they have improved much on teaching it." Don continues, "I'm sure Carl (Bond) is wrong about the coyote scat cigars. I recall Chas. cigars as being a sickly green color, like an elk pellet group during spring green-up."

Don retired two years ago after a rich professional career as a field biologist working with various deer and elk habitat problems and with pronghorn/coyote problems. He says, "I have spent the past two years designing and helping build a passive solar house out in the country with a great view of the mountains . . . Seems like I have been traveling constantly for the past 40 years and I am sure enjoying a spell of spit and whittle."

Thanks to C. Dale Becker ('53),

MS '55) for his continued support of *News & Views*. As Dale says, "For the most part I must ignore solicitations. The primary reason is that I and wife Joanne now have three kids in college (WSU, UW, and Columbia Basin College), and a fourth will enroll at CBC this fall." We know what you mean, Dale. Incidentally, have you considered sending those CBC enrollees to OSU when they graduate?

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From far off Pennsylvania comes an update on **Gary Witner** (Ph.D. '82), now an assistant professor of wildlife technology at the DuBois Campus, Penn State University. Gary writes: "After four years of environmental impact assessments on federal projects for Argonne National Lab, I was definitely ready for a change. . . Vicki, Brian (20 mo.), and I are settled into central PA and really like this rugged, rural, heavily forested area. I am teaching three courses a year in the two-year Associate degree program in Wildlife Technology and hope to begin some preliminary research projects this summer, working with elk, coyotes, and possibly deer/forest regeneration problems. Some of these will be in conjunction with my ol' major prof, Dave deCalesta, who is now with the Forest Service in Warren, PA, only an hour and a half from DuBois."

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We finally got help identifying those two unknown students in the photo taken at Fogarty Creek during a 1937 student outing (June '88 *News & Views*, p. 7). Though **Jay Gashwiler** ('37), **Bill Brown** ('38) and **Fritz Cramer** ('38) were all in the photo, they couldn't name the other two. However, "eagle eye" **Len Mathisen** ('39), retired regional supervisor for ODFW in Bend, had no trouble identifying them as **Jim Leekley** ('38) and **Louis Bowen** ('39), both deceased. Louis passed away in 1978 and Jim—who was featured in the same issue—in 1988.

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A note from **Bernie Carter** ('61, MS '63), wildlife and watershed staff officer for the Ochoco National Forest, saying: "Like all forests in Region 6, the Ochoco is drafting a new land

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# Mailbag

management plan. One of the major issues is livestock vs. riparian habitat. I heard someone say the problem of cattle grazing on riparian habitat could be resolved by crossing cows and fish to develop a more compatible species called a 'cowfish.' " Maybe so. Or maybe it would be about as successful as the notorious Cowalski (the coho-walleye-muskie hybrid) of the Great Lakes.



Awhile back, Max Wilcomb (MS '48, Ph.D. at Oklahoma) made a generous donation to *News & Views*, and to show our appreciation we sent him one of the 50th Anniversary medallion key chains. (A few are still available at \$3 apiece or two for \$5.) Max then wrote the following letter.

Dear Lee,

The commemorative medal is great! Many thanks. I hope this means all is forgiven. You may remember that I was banned from the second floor of the Ag Engineering Building (the Department's headquarters at the time) in the summer of 1947. That's when I was trapping foxes as part of my research. I got 10 raccoon for every fox. That was good; they were edible. But I also got 10 skunks for every raccoon. The only remedy was to hold a gunny sack in front of me and release them. After awhile, I didn't notice the odor anymore but this immunity did not extend to others.

You mentioned my all-beet garden. I don't care that much for beets. It may have been poor planning or more likely only one package of seed. At that time I was living on \$58.60 per month (the Cooperative Research Assistantship stipend). Some of my nutrition came from the traps, as mentioned above. I also remember a great bargain—a case of long-expired Kraft cheese and macaroni and some jars of mincemeat obtained from a railroad salvage. That plus onions, catsup and beans, kept me one whole winter.

My roommate Hans Uhlig was a more versatile cook. He could make a soup with beer which was good, and one involving entrails which was not. Mr. Art Einarsen (Unit Leader) was an able cook and tended to judge his "charges" by their abilities in that direction. Hans and I would throw cinnamon on the stove so Art would think we had been baking something, though we never tried anything more venturesome than leathery pancakes.

The three years I spent at Oregon State were a much-needed period of development for me, and I was particularly fortunate to be there with the legendary personalities. The coursework, though excellent, turned out to be incidental compared to the extracurricular shaping up I got from the staff and other students.

One of my jobs was to assess the viability of pheasants raised to adults at the game farm and then turned loose. If you are wondering, it turned out to be a matter of a few hours or days. It didn't occur to me until much later how similar my own background was to that of the pheasants. Good thing foxes didn't eat inexperienced students!

Anyway, I guess this is as close to a medal as I'm going to get, and you can bet I'm going to hold on to it. My

grandson has been playing with it. Does that make you feel old?

Best Wishes, Max



John A. Johnson ('71), ODFW biologist on the Oregon coast, found the *News & Views* article on band-tailed pigeons by Bob Jarvis to be right on! John, who has been a pigeon hunter for 20 years, is now an author as well. His new book, *Oregon Hunting Guide*, tells you how, when, and where to fill your game bag. John has also published in "Outdoor Life," "Petersen's Hunting," and other magazines.



A humorous note from J. Bret Todd ('83), who recently served as a foreign fisheries observer on Japanese and Korean vessels off the Alaska coast. One South Korean captain was most hospitable and told his cook: "Our American guest will be with us three days. . . Cook whatever you can, American." The Korean cook did his best. First day, applesauce. Second day, French toast. And for his final dinner, something special. All eyes turned as the cook approached the Captain's table and proudly served that classic American dessert—apple pie.

Bret says: "I eyed the pie suspiciously as it was covered with a strange red  
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(Photo by Lee Kuhn)

The students in this 1947 spring outing at the old lab on Yaquina Bay are, from the left, Max Wilcomb, Denis Illige ('48; deceased, 1957), and Russ Hupe ('47). Can anyone help us with the other two?



# Mailbag

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sauce, but it certainly smelled like apple pie. Biting into the warm pie, I winced and then smiled gratefully. 'Catsup? You serve apple pie with catsup on top?' 'Certainly,' replied the grinning cook. 'My friends who visit your country say Americans eat catsup on everything!'"

In the interest of diplomacy, Bret assured the cook it was just the way he liked it.



Another card from those traveling Blaisdells, this time in September from Saskatchewan after a great trip to the Northwest Territories. Jim claims he caught numerous Northern pike, so he must have been so far out in the bush that the fish had never seen a human. He wonders if there are any plans for another get together like the 50th. He's ready for a 55th Anniversary. Is anybody else?



A newsy letter from Robin West ('78) and Shannon Kelly West ('80), now living in Cold Bay, Alaska, where Robin is manager of the Izembek National Wildlife Refuge. As often happens following graduation, Robin worked as a temporary in various positions—with the Fish and Wildlife Service and the Alaska Dept. of Fish and Game. In 1980 he moved to Mississippi to take a permanent job with the FWS. After a year he was able to return to Fairbanks as a biologist in the Arctic and interior Alaska.

Upon graduation, Shannon also worked as a temporary—with the Oregon State Police, the National Marine Fisheries Service, and ODFW. But after they married and relocated in Alaska in '81, she found wildlife jobs scarce, so she moved into business as manager for several retail stores during their stay in Fairbanks.

In '83, Robin became assistant project leader for the Fairbanks Fisheries Assistance Office, working on research in the Arctic National Wildlife Refuge.

## Animal Calls Continue

# Crawling Bats at Large

By DAN GUTHRIE

According to Department veterans, Fisheries and Wildlife fielded all manner of animal calls in the good ol' days. I question whether those days ever ended. Kyla Reid, our chief receptionist, says we still receive several animal calls every week, which she routes to available faculty or students. Here's one she bounced my way last summer. A habitual note taker, I recorded what happened from the outset.

**August 9, 1988.** John Burkhardt called to ask about bat behavior. John is a ranger for Linn County's parks. At Neal Park on the North Santiam River, near Lyons, he was hearing stories of bats crawling along the ground in broad daylight. Was this normal? If not, might the bats be rabid?

I didn't know. I remembered something about pallid bats running

down beetles on the ground, but I didn't think they ranged into the Willamette Valley; and John's bats, described as "little and brown," sounded like something else. I suggested he cautiously collect one and call me back. In the meantime I would talk with our mammalogist, B.J. Verts.

B.J. confirmed that it was not normal for any of our bats to take an afternoon stroll, and that rabies was a distinct possibility.

**August 15.** John Burkhardt called to report crawling bats both at Neal Park and at a nearby residence on the North Santiam. Yesterday a groundskeeper heard one "squealing really loud" and swept it up in midstride. Soon afterward the squealer died. It is now in John's refrigerator, available for a rabies test if anybody wants to come get it.

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He transferred to Yukon Flats as assistant refuge manager in '87, and soon afterward moved on to Cold Bay.

Robin writes: "The refuge supports incredible staging waterfowl populations as well as caribou, brown bears, fisheries, and an assortment of other critters. Shannon and I love the Cold Bay area and the opportunities we have here. . . We have never been sorry for the choice of a wildlife career. It's not always easy but the rewards are great."



Our article on the fur farm brought back memories for Hans Uhlig (MS '47). No wonder, since Hans lived at South Farm from '45 to '47 at the time the fur farm was temporarily shut down. In fact, he used several of the empty fox pens to house his ring-necked pheasants while conducting some feeding trials. Along with Max Wilcomb, a sheep dog, and a pet skunk, Hans lived in a garage that had been converted to student housing. He

retired in '86 as head of the Ecological Science Staff for the Soil and Conservation Service. He now lives "in the mushroom center of the world," West Grove, Pennsylvania.



Some bits and pieces from Dick Pedersen ('61, MS '63, Ph.D. Idaho '86). He's now a wildlife biologist for the Forest Service, Region 6. Dick says: "You're right, it ain't easy anymore. . . But there is some *good* news and one must keep things in proper perspective. Last year our FW budget in this region was \$4.2 million; for '89 it will be \$11 million. When I started in this region there were 12 biologist; now we have 170. Our foresters can't burp without a biologist hearing it."

Congratulations to Dick who, as president-elect of the Northwest Section of The Wildlife Society, is putting together a joint meeting with the Western Section. He's shooting for Reno in April, 1990.



# Bats in the Walls, Bugs in the Bed

(Continued from page 6)

John said the bat had several parasites, which he described as orange, round, bug-like, and about the size of a pencil eraser. The parasites decamped quickly after the bat died. He thought they might have eaten a hole in its wing. Was anyone at OSU interested in examining any of this?

**August 19.** I met John at Neal Park to claim the corpse and reconnoiter the situation.

"Bad news," he said. "My wife objected to the bat being in the refrigerator. She made me freeze it. I guess you can't test for rabies if it's frozen."

That was my understanding, too. I thought the Negri bodies diagnostic for rabies didn't show up in frozen brain tissue.

He presented me with the bat in a zip-lock plastic bag, and I promised to identify it. Then we walked to the nearby home of Linda Faria, who had seen bats crawling on her deck during the summer and had picked up a dead one earlier in the week. We found Linda outside her new log house, looking very handy in coveralls. In fact she *was* very handy—she had built most of the house herself.

"Where's the bat?" asked John.

"I buried it," said Linda. Seeing our disappointment, she suggested, "We could dig it up?"

"No, thank you. It would be too far gone by now," I said. "What about the bugs? Did you keep any of them?"

"Oh, I have plenty of those," she said, and produced an orange bug in a bottle. It was the size of a worn-down pencil eraser. "I can hear the bats between the walls of my upstairs bedroom. Lately, I've been finding their bugs in my sheets. I think the bugs have started biting me. What are they?"

"I don't know," I said. Responding to animal calls soon acquaints you with your ignorance. "But I'll find out."

I then climbed a ladder to the peak of the two-story house, where I poked a broom handle into a cavity in search of possibly rabid bats. This approach didn't make sense at the time, and it still doesn't; yet we all felt something needed to be done. To my relief, no bats emerged.

Back in Corvallis, with books and dead specimens arranged before me, I determined that the bat was *Eptesicus fuscus*, the big brown bat. The bug proved to be a bat bedbug, a kissing cousin of the human bedbug. I telephoned John to

deliver the facts, which I fleshed out in a letter that read, in part, as follows:

"Enclosed is a good account of big brown bats taken from *The Natural History of Oregon Coast Mammals* by Chris Maser. In it you'll find that 4 percent of their prey consists of terrestrial beetles. Maser claims the beetles are caught on the wing, but is it possible some are taken by bats crawling on the ground, which would explain this summer's unusual behavior?

"As for the parasites, they are in the bedbug family and are closely related to human bedbugs. One report said that a researcher handled parasitized bats without being bitten by their bedbugs, but Linda Faria's experience appears to contradict this. Maybe if the researcher had *slept* with the bugs, he would agree with Linda. Anyhow, as you know, even if the bats had rabies, insects can't transmit it."

**September 2.** John called to say that Linda had caught a bat in the ivy below her deck, where she heard it squealing, and that picnickers had encountered still more of them crawling around Neal Park. He has the captive at home and is feeding it mealworms. John and his wife rehabilitate injured birds, so they maintain a mealworm colony.

"If the bat keeps eating, we'll know it doesn't have rabies," I said, still trying to sell my hypothesis that terrestrial behavior in *Eptesicus fuscus* is normal.

"That's right," agreed John, who wasn't eager to sound a rabies alert among park visitors.

**September 8.** The bat died yesterday morning, Wednesday. John said it ate well and drank water out of a medicine dropper over the weekend. Monday morning it wouldn't eat, and a few hours later it stopped drinking.

**September 9.** I called OSU's Veterinary Diagnostic Lab to ask about their rabies testing procedure and discovered they can work with frozen animals after all. "It costs \$14. You bring in your animal by 2:30, we'll have it out by 5:00," said the secretary. At 1:30, I delivered the bat John froze. True to its word, the lab called back in the afternoon with the results. The bat tested positive.

"This year we've had five positives, all *Eptesicus fuscus*," said Bob Sonn, supervisor of the vet lab. "Generally, no more than 3 to 4 percent of all the bats we test are positive, but this year the figure will be a little higher."

**Postscript.** In the following weeks, John Burkhart responded to a few more sightings of squealing, crawling bats at Neal Park. Nobody was bitten, and the bats migrated south when cold weather arrived, taking the problem with them. He now has other things on his mind, such as a huge yew tree east of Lebanon, near Waterloo, which might be a world record. A tree inspector for the city of Portland is coming down to help him make the measurements needed

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# Hallmark of Oak Creek: Diversity

By BILL LISS

Research at the Oak Creek laboratory has been notable for its diversity. It has ranged from water pollution studies to the classification and ecology of streams to the philosophy of science and resource management. It has asked scientific and sociological questions. And it has involved development of theories and models as well as detailed empirical work in both the lab and the field. The common philosophical framework underlying and unifying these diverse efforts is discussed elsewhere in *News & Views* by Charles Warren.

I cannot detail the scope of Oak Creek research over the past 35 years, both because of limited space and incomplete knowledge of work done in the early days. Instead, I shall focus briefly on some of the major themes of our present research program, fully acknowledging that the present is a product of the past.

Oak Creek researchers continue to study how streams and salmon runs of the southern Oregon coast are affected by logging. In the last 40 years, clear-cutting and road-building on unstable terrain has left a legacy of landslides that deposit large quantities of coarse and fine sediments in stream beds, thereby degrading the habitat for

This is the first of four articles on the research, history and philosophy of the Oak Creek Lab.

spawning and rearing. The effects of upland and streamside slides accumulate downstream, seriously damaging valley reaches once important as rearing areas.

Over the past 15 years, the lab has been developing classification systems for watersheds and stream habitats. Some of this work was funded by the Oregon Department of Fish and Wildlife, and we have enjoyed working with former Oak Creekers Jim Lichatowich, who was largely responsible for the genesis of the project, and Tom Nickelson. These systems can be used to anticipate effects of land-use activities on streams and their fish populations. To date we have focused on Oregon coastal streams, but there are plans to expand.

As part of a project funded by the National Park Service we are developing a classification of high mountain lakes, which I will say more about in a moment. We are also extending our concepts to the marine environment by developing a classification of major marine habitat zones from Southern California to Alaska. We intend to use these zones

in identifying marine fish communities and examining their responses to human activities.

The study of how human activities affect biological communities is another focus of Oak Creek research. For example, the high mountain lakes of the Oregon and Washington Cascades were created by glaciers thousands of years ago and lacked fish until recently, when packers began stocking them with trout. The main concern of those who introduced fry was whether they would grow up to become pan-sized fish. The National Park Service has other concerns. Its mandate is to preserve lakes in their natural states, and research suggests that introducing fish to fishless lakes can radically alter them, sometimes by eliminating natural species.

In collaboration with Gary Larson, another Oak Creek graduate and now an aquatic ecologist with the National Park Service, we are beginning a study of the effects of fish stocking on the biological communities of montane lakes in the North Cascades National Park. Part of this research will include development of a classification system, to be used in selecting which of the park's 160 lakes we will examine in detail.

Our community work has not been confined to lakes and streams. Some years ago, in southern Oregon, we studied insect communities of pear orchards, and we are now conducting similar studies on fruit trees and insects in Central Washington. In both cases the objective of integrated pest management shaped our approach.

Community biology has a long history at Oak Creek. For many years we have used laboratory streams (scaled-down models of natural streams, maintained under known conditions) to investigate fundamental questions in stream ecology. We have also used them to measure the impacts of aquatic contaminants on stream communities, but I will leave discussion of physiological research to Larry Curtis.

## Rabid Bats a Rarity in '88

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for verification. John wonders whether I'm interested in the outcome. Well, sure I am. Who wouldn't be?

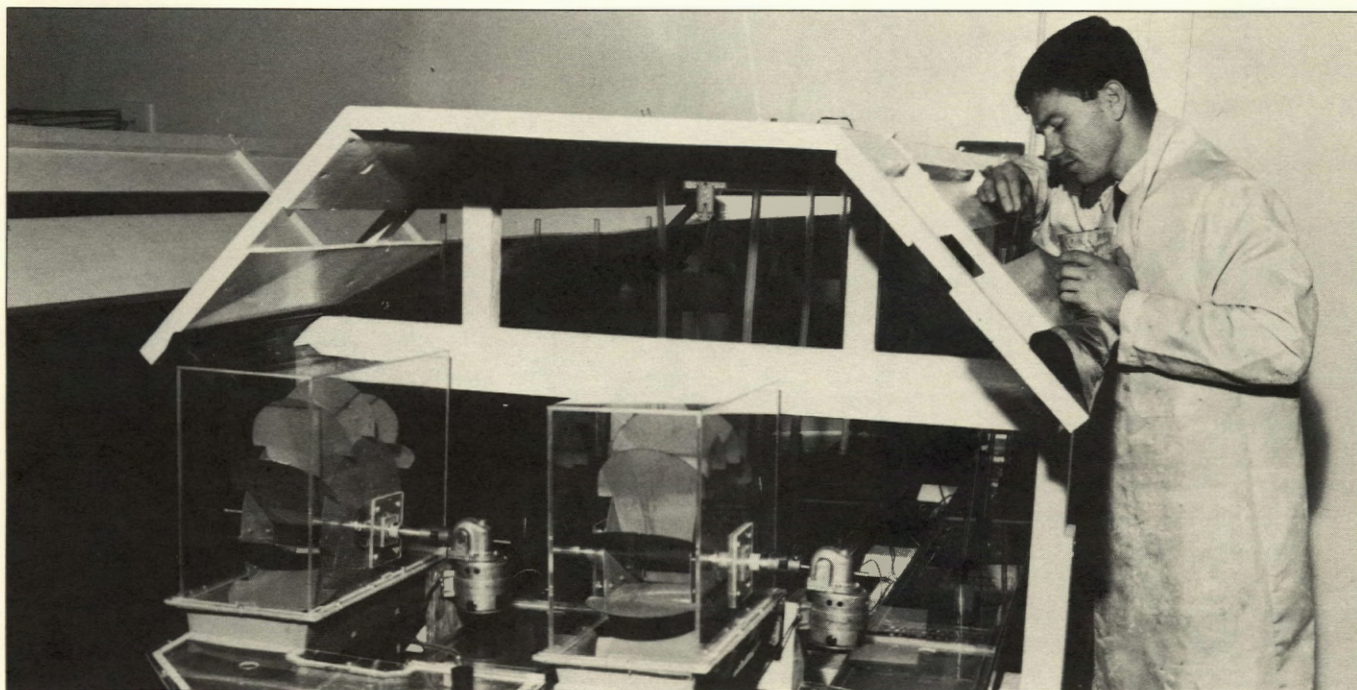
Bob Sonn reported that no more rabid bats were identified during the 1988 season, either by his lab or by the state lab in Portland. In fact the only other rabid animal they saw was a horse from California. He reassured me that freezing was the best thing you could do to a bat suspected of being rabid. The old tests relying on fresh tissues haven't been used since the '70s.

Bat bedbugs, it turns out, do bite people, a habit they might have picked up when bats shared caves with our ancestors. Linda Faria thought her bugs had disappeared with the bats—until she spotted one while changing her sheets at Thanksgiving.

"I squeezed it just enough to kill it. The bug still looks pretty good. I'm keeping it in case anybody is interested," she said.







Oak Creeker Floyd Hutchins (MS '74) tests effects of temperatures, oxygen levels on swimming trout.

## Link Sought between Trout Tumors, Toxicants

By LARRY CURTIS

For the past decade, much of the physiological work at Oak Creek has focused on the responses of rainbow and steelhead trout to environmental pollutants. We have experimented with these fish to gain a better understanding of how chemical contaminants affect not only their health but that of humans.

Consider, for example, the case of cancer in fish living in heavily polluted waters. The public is keenly aware of this problem. Anglers who catch diseased fish, and people residing in areas where the fish occur, suspect that the incidence of cancer rises as pollution increases, and many of them view the fish much as coal miners view their canary—when the canary keels over, it's time to head out.

In one project conducted at Oak Creek in collaboration with OSU scientists in the departments of Food Science and Agricultural Chemistry, we are studying chemically induced cancers in rainbow trout. We are especially interested in the influence of environmental temperature on the incidence of these cancers. Through

our participation in OSU's Marine and Freshwater Biomedical Center, we intend to describe the environmental and human health risks associated with tumors observed in wild fish.

Our interests in water quality and its effects on fish health have led us into other several other areas. For example:

- We have just concluded studies of grass carp bioenergetics, which we believe will be useful in explaining the responses of Devils Lake to the recent experimental introduction of these vegetarians into its weed-choked waters. Grass carp introduced into other U.S. lakes, most of them in the South and Midwest, created undesirable blooms of bacteria and blue-green algae. In Oregon's cooler coastal lakes, where the fish eat only 25 percent of their body weight per day, there is less likelihood of the unwelcome blooms.

- Soon we will publish research conducted in cooperation with the U.S. Environmental Protection Agency on the potential toxicity of acidic pulses to fish. Acid rain commonly results in episodes of reduced pH in streams

and rivers, and we have shown that the duration of these episodes greatly influences their impacts on trout.

- A project we've just begun looks at the effects of pollution on wild fish in the lower Willamette River. We selected sculpins because they tend to remain in the same area over time. With the help of the Oregon Department of Environmental Quality, we are transporting wild fish taken from polluted and relatively clean river water to Oak Creek, where we conduct laboratory growth studies. By analyzing chemical residues in fish tissues and correlating the results with growth rates, we hope to better understand what chemical contaminants do.

At Oak Creek, we are committed to increasing knowledge of fish physiology and biochemistry, and to applying what we learn to resource science and management. The students and faculty involved in our studies continue to benefit from traditions now more than 35 years old. We owe thanks to those who established and have maintained Oak Creek, and we look forward to the continuing success of the laboratory.



# Oak Creek History

By WAYNE SEIM

In the summer of 1958, Chuck Warren, Pete Doudoroff and John Fryer went to Oak Creek in search of a new site for the Squaw Creek Lab. They liked what they found: a dependable supply of high-quality stream water whose watershed was protected within the McDonald Forest. The dwellings weren't much, consisting of the original forester's house and horse barn, but work to improve them soon began, with Fryer and Don Overholser doing much of the plumbing and construction.

The move was prompted when the Squaw Creek Lab—founded in '52 by Carl Bond and joined by Warren in '53—expanded to include federal Public Health Service personnel interested in water quality. Doudoroff, George Chadwick, Max Katz, Dean Shumway and perhaps Joe Wales were among this early group (some of my names, dates, and events are a little fuzzy, even in the memories of those who were there).

Wales turned his attention to Berry Creek, which was developed for a cooperative study with Warren on stream enrichment, and the feds joined the Oak Creek program. It then became The Oak Creek Laboratory of the Pacific Cooperative Water Pollution and Fisheries Research Laboratories. In theory this cumbersome name reflected the involvement of both the Public Health Service and the Department of Fisheries and Wildlife.

Jerry Davis (MS '60, Ph.D. '63) was the first student to complete a degree at the new lab, although Donald Chapman (MS '57, Ph.D. '63) may



Researchers may vary substrates, flow rates and communities of lab streams.

have been the first for the program.

Early financial support came from the Public Health Service, the pulp and paper industry, and the National Science Foundation. In 1965 a series of federal agency changes began, leading to the creation of the Environmental Protection Agency in 1970. With the construction of EPA's Water Quality Lab in Corvallis, the direct federal involvement at Oak Creek came to an end. Doudoroff, Chadwick and Shumway elected to stay, and in the late '60s they joined the OSU staff of Warren and Jerry Davis (now with the Fish & Wildlife Service on the Columbia River). The new lab name, The Oak Creek Laboratory of Biology, was eventually routed on a large slab of cedar by Howard Whorley, maintenance repairman.

Among the first wave of students was C. David McIntire (MS '60), now with OSU's Botany Department. He studied the influence of light and water velocity on periphyton in laboratory streams, thus introducing the lab-stream investigations that would bring acclaim to Oak Creek. Subsequent research used these streams to examine predator/prey interactions, effects of industrial wastes, and effects of pesticides, metals, elevated temperatures and reduced oxygen.

The work of Doudoroff and Shumway concentrated on oxygen requirements

of fish, culminating in their classic paper on the water quality criteria for oxygen. Other research themes of the '60s included bioenergetics and growth of fish, and analyses of trophic processes by Warren and Robert Brocksen, developed later as isocline theory with Mike Booty. Hugo Krugler added a physiological approach to energetics during this period.

The 1970s brought broader interests. These included studies of the effects of elevated temperatures in model streams; Gary Larson's work on chloramine toxicity and on lake sediments; toxicant interaction studies by Lavern Weber; stream sedimentation studies; and Bill Liss's work with pesticides in microcosms. The toxicological expertise added by Weber opened avenues now explored by Larry Curtis in his investigations of liver function in poisoned fish.

In the 1980s, the lab's work with stream and watershed classifications came into its own, along with timely studies of toxicants, as discussed elsewhere in *News & Views*.

The history of Oak Creek can be viewed by looking through the theses that take up two shelves in the lab's conference room. For some of us, it can also be viewed when we think back and see the faces of nearly 200 people who worked a little harder, and cared a little more, than what was expected of them.



By **CHARLES E. WARREN**  
Professor Emeritus

When invited to write a brief history of the Oak Creek Laboratory of Biology, I accepted, if not with enthusiasm at least with determination. But on reflection I began to waver. Oak Creek has involved the best efforts of perhaps 200 graduate students, undergraduates, secretaries, maintenance people and faculty for 35 years. Each played an important part in the continuing story of what became known as the Oak Creek Laboratory. Each brought knowledge, enthusiasm and creativity to the program. Not wanting to do a history failing to capture the important contributions of these individuals, I demurred.

Still, there were principles we learned together, principles that over time gave our work a certain flavor and coherence. Perhaps my attempt to capture even briefly something of these principles will remind us of the years we spent together.

Research, first and foremost, is a learning experience for those involved, whether they are undergraduates, graduates or the more experienced. It does, without doubt, tell us something about the world, but only as understood from the background, theory and methodology of the investigators. Failure on the part of the faculty to recognize this reduces the value of the learning experience and is even painful in the special case of graduate student theses. Thesis research usually marks the formal beginning of more scientific learning for graduate students. To expect them to produce some singular truth about the world, and thereby demonstrate they have magically become accomplished scientists, is a naive caricature of graduate education, to say nothing of science.

If our world views and theories shape how we understand experience, then it becomes essential to articulate, understand, and employ them in further learning. This, it seems to me, is the second principle making the Oak

Creek experience what it has been.

Gradually, we came to see that the world view of standard empirical science distorts biological and social sciences and their applications in resource management. The view that behind the veil of appearances there exist changeless fundamental relations, ultimately defining a knowable, machine-like universe, has led resource economists and biologists to take their welfare and production relations rather too seriously. This has blinded us to theories designed from a more contextualist world view.

An appreciation of such theories, and of how they might introduce

## *Tenets Of the Oak Creek Philosophy*

developmental and other qualitative changes into social and biological thought on resource problems, began to influence work at Oak Creek 15 or more years ago. With this appreciation, our work began to be guided by the principle of coherent articulation of world view, conceptual framework, and theoretical hypotheses, as well as the more empirical ones of model and observation. Experience, theory and practice must develop together and be the concern of everyone, not some special few.

This brings us to application of knowledge in the practice of resource management. Here the simplistic notions of causality and truth have led to disastrous consequences in agriculture, forestry, fisheries, wildlife and other environmental sciences. What empirical knowledge we have in these resource sciences is perfused by unacknowledged conceptual structures,

including the cultural values of capitalism. Application of this knowledge is always tenuous, frequently indifferent, and too often harmful. There is a cautionary principle here.

Notions of equilibrium, maximization, and efficiency are rampant in resource economics, agriculture, forestry, fisheries, and even wildlife science. Professionals in all these pretend to know objectively what is best for the rest of us. They and their agencies have directly or indirectly participated in the demise of communities and subcultures of inherent value in our society.

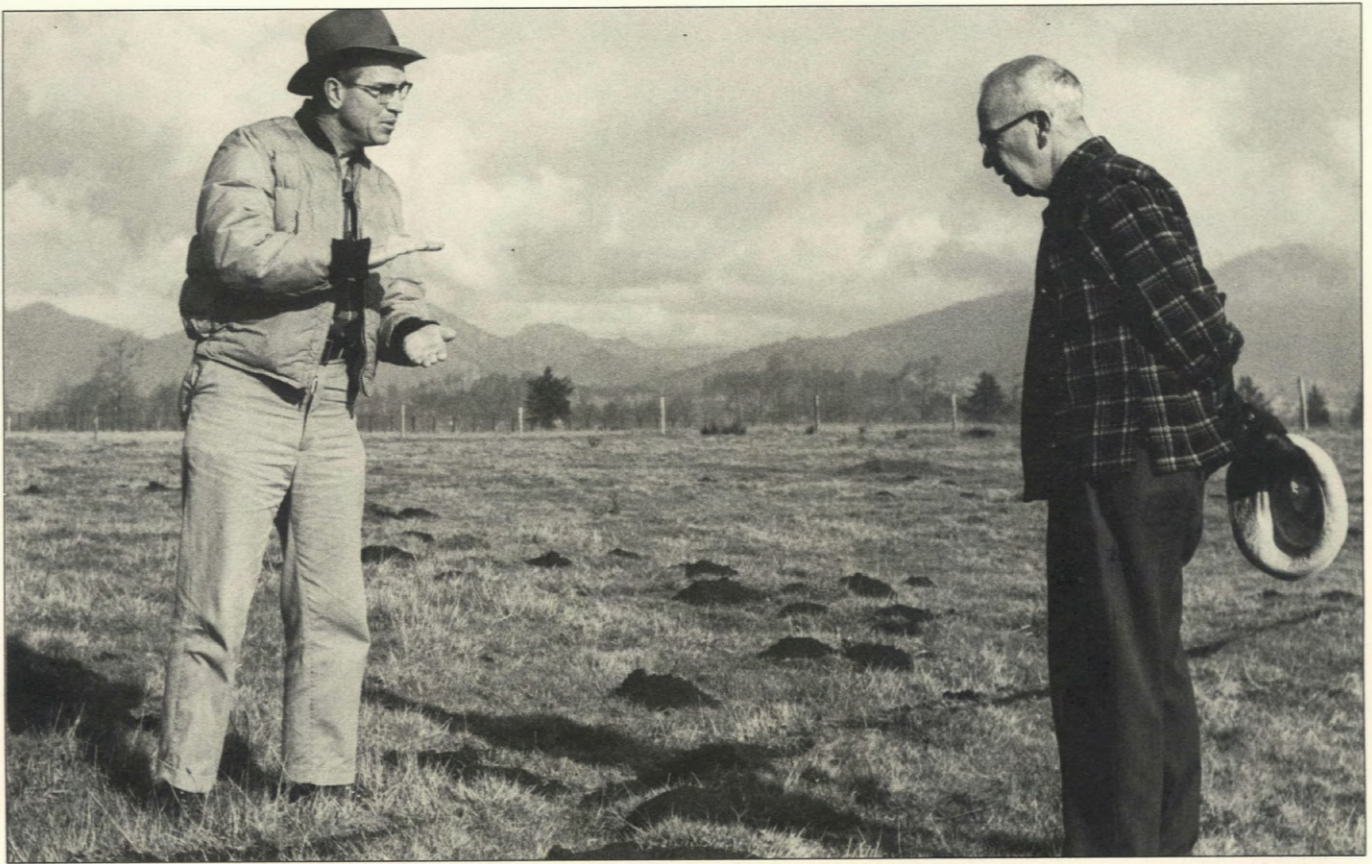
Perhaps most of us from the Oak Creek Laboratory would recognize the maintenance of communities and subcultures to be of more importance than the maximization of production and efficiency of whatever. At least I hope so.

Finally, I think that what I will call the principle of critical understanding has, almost from the beginning, shaped experience and learning at Oak Creek. This entails a continuous reflection, questioning, and revision of what it is we think we know and what view of the world makes that problematical knowledge possible.

This view of resource science and management was not received with the keys to the McDonald Forest Guard Station that became the first facility at Oak Creek. Neither was it learned quickly by students and faculty beginning to work there. Rather, over different time periods and by different groups, these principles were articulated. Perhaps my brief account will help to bring us all up to date.

Having recently left our laboratory, as did many before me, I am only too aware that the story will need updating in a few years. Others who have learned and continue to learn at Oak Creek, and certainly others who have been associated with the Department, would present different perspectives. These I anticipate reading from time to time in this journal.





(Photo by Bill Wick)

Lee Kuhn explains moles to Prof. Dimick in this 1963 photo at Tillamook Air Base. See story, p. 1.

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