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Wetlands Fight Waste

Cattails, sedges and bulrushes "eat" pollution

Otto Stein and Paul Hook are finding out just how much nature can do to help us clean waste water. Stein is a civil engineer at Montana State University. Hook is a biologist in the MSU Land Resources and Environmental Sciences Department. The two study how manmade wetlands can be used to treat organic waste – whether agricultural or human.

With several small grants, they constructed miniature wetlands in tanks at MSU's Plant Growth Center. The microbes, cattails, sedges and bulrushes clean wastewater of about 90-95 percent of its dissolved organic carbon, and up to 80-95 percent of nitrogen, even at cold air temperatures.

"The morning air could be below zero, but the water may still be unfrozen underground," says Stein. Their work has shown water cleansing underway in wetland systems when the water temperature is just 36 degrees Fahrenheit.

Hook adds that a water temperature 36°F can be maintained in Montana and other northern climates with plant debris and snow cover to insulate the ground.



Deb Borden, a master's student from Whitefish, assists MSU faculty with research that shows how wetlands can clean up agricultural and human wastes. (More on p. 6.)

The top "pollution-eating" plants tested so far are sedges and bulrush. Either does a considerably better job than cattails.

For more information, call Otto Stein at 994-6121 or Paul Hook at 994-3721.

New NWARC head brings value-added experience

Duane Johnson is now the new superintendent of the Northwestern Agricultural Research Center near Kalispell. Leon Welty, the current superintendent, is retiring.

Johnson will add a new dimension to the research centers, says Mal Westcott, department head of all the research centers.

"He has a unique background in market development as well as traditional plant breeding and agronomy. That made the search committee and all of us excited to get him here," says Westcott. At Colorado State University, Johnson worked with new crops and value-added programs, including manufacturing canola- and sunflower-based motor oils, irrigation drip oils, equine dust suppressants, and frozen



Duane Johnson has developed many new products, including motor oil made from canola and sunflowers.

green soybeans and vegetables.

Johnson is a 1979 graduate of Montana State University.

"I hope to do for Western Montana what I was able to do in Colorado: develop new value-added agricultural crops and products to strengthen the rural economies of the area, including forages and specialty crops," says Johnson.

"The research centers quite often get involved in specialty crop development," says Westcott. "We're trained to do the basic production work, but Duane has been heavily involved in

taking things to the next step in marketing products or looking at unique markets for specialty crops. He has a unique set of qualifications."

For more information, call Mal Westcott, (406) 961-3025.

From the Dean

By Sharron Quisenberry
Dean of the
College of
Agriculture



As we look back over the past year, I am pleased with the progress and the direction of the College of Agriculture. The College has undertaken strategic planning and now has a plan to guide our decisions over the next five years. A brochure that lays out the strategic plan is available from my office. Reviews of two departments,

Animal and Range Sciences and the Research Centers, have provided positive feedback on their strengths and suggestions for improvements in the services they provide to Montana. A recent conference on partnering for Montana's future brought together leaders from Montana's many agricultural organizations to discuss what Montana can do to maintain the strong role agriculture plays in the state's economy. A foundation was laid at the meeting to work toward creating a potential for economic development using an agricultural product base and the potential for adding value to agricultural products including food processing.

As we look forward to the next year, I

am excited about the opportunities to make the College of Agriculture stronger and more responsive to the needs of Montanans. Our budget request before the 57th Legislature would help us maintain the number and quality of research projects and educational programs that keep Montana at the forefront of the agricultural industry. I appreciate the support that you have given me and the College of Agriculture and hope we can count on you in 2001. Happy New Year.

Ag Appreciation Weekend educates public, raises \$22,000 for student activities fund

From cheeping chicks to creeping tarantulas, country swing to kissable cows, the College of Agriculture campus was alive on Nov. 3 and 4 to celebrate agriculture with hands-on exhibits and insights into the world of food and fiber.

Over 500 high school FFA and 4-H members participated in competitions on campus, displaying their knowledge of agriculture and learning about MSU.

Nov. 3 was Community Day, when the College opened its doors to the world. Each department exhibited a few of their educational and research programs. The Petting Farm and Insect Expo were highlights of the day.

On Saturday, the College's faculty, staff, students, alumni and friends kicked up their heels at the tailgate, football game and dinner and dance. History repeated itself as Dean Sharron Quisenberry was elected to kiss the critter (a cow this time) at halftime of the football game.

The College of Agriculture also honored its 2000 Outstanding Agricultural-



The petting zoo during Ag Appreciation weekend included sheep, rabbits, alpacas, geese, a goat, a pig and a miniature cow.

ists throughout the weekend: Don and Bernadine Lake of **Ronan**, Ralph Peck of **Helena**, and Ole Ueland of **Silver Bow** and **Deer Lodge** counties.

While educating the public about agriculture and having some fun, the College of Agriculture also raised over \$22,000 for its Student Activities Fund.

Jim Peterson earns outstanding alum award

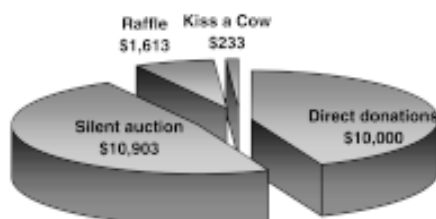
Jim Peterson of **Judith Gap**, a 1968 MSU College of Agriculture graduate, received an MSU Alumni Achievement Award in October. Jim has devoted his personal and professional life to advancing agriculture at MSU and in Montana. He owns and operates farming and ranching operations in central Montana and has served as executive vice president of the Montana Stockgrowers Association from 1990 through 2000.



Peterson served on the MSU Presidential Search Committee and is a member of the MSU Foundation Board of Directors.

Ralph Peck, director of the Montana Department of Agriculture, said, "His dedicated professionalism and success in a leadership role for Montana agriculture is a credit to Montana State."

A letter from Gov. Marc Racicot read, "Jim is an example of what education, confidence, and determination can achieve. Individuals like Jim Peterson embody the ideal behind the Alumni Achievement Award."



From beef to grain to soils to hi-tech... Northern Ag Research Center does it all

Approaching the old Fort off of US Highway 87 west of Havre, you notice the clean fields and the well-kept older buildings. It doesn't quite look like a ranch, but it looks less like a research center that is covering a multitude of research areas.

The focus of Northern is not easy to describe in a few words. It ranges from beef breeding to site-specific farming, from studies of an advanced grain quality monitor to experiments with use of the global positioning system to track cattle grazing and livestock management. The Center evaluates heifer breed types suited to northern Montana and uses GPS satellites to evaluating site-specific nitrogen management in grain.

After you're there a while, you'll discover that they evaluate barley varieties and cattle breeds not only in the field but also in the feedlot, and conduct sophisticated studies for improving grain yields by simple adjustment of air drills and openers.

The Center's personnel complement each others' skills. Don Anderson is superintendent and a beef cattle scientist, Gregg Carlson heads the agronomy studies, Derek Bailey leads the way on GPS use in livestock management while Dan Long oversees GPS use in grain production. Darrin Boss helps with beef cattle research and Garnet Bergren makes the office run.

It's a team that has helped make many recent contributions to cattle, grain, forage and soil studies in Montana. Discoveries include:

- planting wheat in a wider band than usual increases yields and decreases wild oat competition;
- producers can select for both small



Agronomist Gregg Carlson harvests a wheat trial plot at the Northern Ag Research Center.

birth weight and higher weaning weights at the same time;

- wheat varieties respond to fertilization differently, so variety selection and fertility programs need to be coordinated;
- because soils in the same field affect varieties differently, it may be profitable to plant different varieties on contrasting soils of manageable size even in the same field;
- cattle breeds graze foothill rangelands in different ways; and
- there are differences in efficiencies of biological types of beef cattle in northern environments.

The Center also helped test a new barley variety that makes a better cattle feed and is the main site that helps to test the appropriateness of wheat varieties for northern Montana east of the Rockies.

The Northern Agricultural Research Center at Havre was established at the old Fort Assinniboine in 1915. Even though the researchers of 85 years ago would not recognize most of the equipment used for today's projects, the Center's goal has never changed: to serve Montana farmers and ranchers by seeking more profitable ways to produce, market and use agricultural products.

For more information, call Don Anderson at (406) 265-6115.

Just give me some space!

Researchers at MSU's Northwestern and Northern Agricultural Research Centers found that wheat seeds need their personal space, too. Gregg Carlson, an agronomist, and Bob Stougaard, a weed scientist, used an air drill to plant spring wheat in 4-, 5- and 6-inch wide bands with four densities of "wild oats" under black fallow conditions. They discovered that the seedlings in the 6-inch band got more water, nutrients and sunlight, thus increasing their advantage over wild oats. This led to increased population density, head numbers and yield.

For more info, call Carlson at 265-6115.

Pascual heads Bison Center

David Pascual is the new director of MSU's Center for Bison Studies, which serves as a regional center for information exchange and research on the biology and management of American bison. The center hopes to expand its focus to other wildlife diseases including some with human health implications, such as elk wasting disease, which is closely related to "mad-cow" disease in Europe. Funds for the center are "investigator obtained," not state tax supported, says Pascual.

For more info, call Pascual at 994-4705.

Whacked-out wildfires

A tongue-in-cheek term called the "Out of Whack Index" can help us understand why Western wildfires are burning bigger and hotter than ever before. Lisa Graumlich, director of MSU's Mountain Research Center, worked with Andy Hansen from MSU's ecology department to study fire patterns based on living and dead trees. The frequency of fires in prehistoric times compared to those in more recent times can reveal if an area is "out of whack." Summer fires at Los Alamos, N.M. were "10 cycles out of whack"—an area that prehistorically burned every seven years hadn't burned for 70. In addition to helping quantify the risk of future fires, the research may give insight into recent global warming trends.

For more info, call Graumlich at 994-5320.

Livestock judging, meats teams return

"After careful consideration, I placed this class of", will soon be heard from MSU students. As of October, the MSU College of Agriculture has a livestock judging program again. A meats team will be formed this fall.

The livestock team includes 12 students who start competing this fall. They practice every week.

Two new introductory classes will help build MSU's judging program. ARNR 205, an introduction to meat evaluation, and ARNR 309, an introduction to livestock evaluation, are open to all ag students. Team members are required to take both classes.

Marc King of **Big Timber** coaches the livestock team. King was a member of the



The Montana State University Livestock Judging Team is practicing and recruiting now. A Meats Judging Team begins this fall.

Montana State Livestock Judging Team in 1988 and 1989. Dr. Jane Ann Boles will coach the meats team. Boles was a member of the University of Missouri Meats Team in 1986 and helped coach the Iowa State team in 1988 through 1990.

In livestock contests, students evaluate breeding and market animals. Meats

teams judge yield and quality grading and carcass value, as well as different classes of beef carcasses, beef cuts, pork carcasses, pork cuts, lamb, and specifications of 15 cuts.

The teams hope to officiate other contests and provide workshops to raise funds for travel and recruiting new members from MSU and junior colleges.

The MSU meats lab will be beneficial in helping the students observe carcasses on the rail and put this knowledge back into their live evaluations.

The **Montana Beef Council** gave \$40,000 in 2000 to support the judging team, \$10,000 for a meat science lab technician, and \$5000 for the Ag Appreciation Weekend student activities.

Please contact King or Sandra Germann (994-7671) for ways you can support the judging teams.

Meat science intern develops important food safety plan for lab

If the goal of an internship is to gain real-life experience, Kelsey Groenlund of **Tigard, Oregon**, has her hands full in the MSU College of Agriculture Meats Laboratory.

A senior majoring in animal science, Groenlund is working with Dr. Jane Ann Boles, MSU's meat science professor, to develop the HACCP (pronounced *hass-ip*) plan for the meat lab in the College. HACCP stands for "Hazard Analysis of Critical Control Points," and is an important and internationally used standard for food safety. A HACCP plan ensures that proper procedures are followed so that foods will not be contaminated.

Though familiarity with HACCP is crucial to professionals in the meat industry, it is rare that someone outside of the industry gains this level of understanding.

Groenlund will attend MSU for an extra semester to take advantage of a meat processing class offered by Boles in Fall 2001. She will then have knowledge of fresh meat, processed meat and the HACCP program, a combination that will

make her much more eligible for employment within the meat industry.

Groenlund has developed a plan over the past months and will be monitoring the program over the next semester.

"The HACCP plan is not stagnant. We have to keep up with technological and day-to-day changes with the plan in order to make it effective," said Dr. Boles. Both Boles and Groenlund will take a HACCP exam so they are approved to compile an effective and verified HACCP plan for fresh meat, ground meat, ham, bacon, sausage and jerky.

Groenlund said that the internship is a once-in-a-lifetime opportunity, as this is the first and only HACCP plan for the lab. The hands-on opportunity has allowed her to take her experience from class last spring to a new level of application.

Dr. Boles hopes eventually to sell meat products that the College of Agriculture manufactures under its own label. These products would then provide funding for the lab while educating students about meat processing.

Russia bound...



*Two MSU College of Agriculture students are off to Moscow State Agroengineering University for a semester exchange this spring. Casey Saxton (left), a junior in Ag Operations Technology, is from **Chester**, and Wade Taylor (right), is a junior in AOT from **Durango, Colo.** MSU-Bozeman was chosen in a collaborative partnership with seven other universities. Dr. Marty Frick, Ag & Tech Ed. professor is organizing the program. For more information about the program, or to offer support for these students, call Frick or Sandra Germann at (406) 994-7671.*

The College of Agriculture scholarship deadline is Feb. 1!

www.montana.edu/agriculture

Bayard L. Taylor estate gives \$3.3 million to scholarship fund

The College of Agriculture recently received a gift of \$3.3 million from the trust of Bayard L. Taylor. The gift, to be placed in endowment for agriculture student scholarships, *doubles* the amount currently offered to students to over \$300,000 annually.

"It is a very generous gift that we most appreciate," said Dean Sharron Quisenberry. "The gift has already made a difference in many students' lives."

Taylor was involved in agriculture throughout his life—from helping on the family ranch to working in ag banking and government agencies.

He was born in 1906 near Cascade. Taylor studied animal husbandry and agronomy at MSU and was a member of the honorary scholastic fraternity Phi Kappa Phi. After graduation, Taylor worked as an appraiser and inspector for a credit associa-



Bayard L. Taylor

tion, then was a case-worker for the Montana Relief Commission, working with drought-stricken producers.

That agency was later absorbed by the Montana Rural Rehabilitation Corporation which then became part of the Farm Security Administration. Bayard worked with those organizations for eight years before returning to help with his family's ranch after his parents were in a severe accident.

Taylor later worked for Union Bank and Trust Company in Helena, responsible for agricultural loans. He retired in 1966 and spent many years traveling with his sister Lily. Taylor died on June 24, 1987 in Livingston at age 81.

It is with heartfelt thanks that the college remembers Bayard L. Taylor.

Thank you, C.N. Mason, Jr. for biographical information



By Sandra Germann
Director of Development

If you'd like to talk to someone in your area

about the College of Agriculture, or making a gift to the college, a new board has been formed of ag industry leaders from around the state who would welcome a visit with you. The purpose of the College of Agriculture Development Board is to "support and promote the College of Agriculture at Montana State University (Bozeman) through statewide networking, public relations and assisting in generating gifts and other support to the College."

See the list at left for the Board member to contact in your area.

If you or your organization would be interested in seeing the new **College of Agriculture video**, please contact me or the Board member in your area.

On behalf of the college, thank you to alumni and friends who gave \$4,670,693 to the College of Agriculture in the fiscal year 1999-2000. \$3.3 million of this was from a trust by Bayard L. Taylor (see article at left).

Total disbursements in 99-00 from the MSU Foundation to the College of Agriculture was \$349,547. This is second only to the College of Engineering in total disbursements to the colleges and libraries at MSU.

Thank you, alumni and friends, for your generous support again this year

Sandra L. Germann

Class of '89 (BS), '91 (MS) AgEd/ Extension

For information on ways you can contribute to college programs, contact Sandra Germann at 406-994-7671. Or check the college's web site at <http://www.montana.edu/agriculture/>

Litzenbergers donate \$100,000

The Litzenberger Molecular Plant Breeding endowment was recently established to support graduate research assistantships in Plant Sciences. The fund will support students' research projects in crop improvement, plant pathology and weed control. The \$100,000 endowment is the second of three major gifts given by Dr. Samuel C. and Hazel West Litzenberger. The Cereal Quality Laboratory in the Ag Bioscience Facility is named after the couple, and their scholarship endowment helps students in the plant science, horticulture and biotechnology fields.

Dr. Sam Litzenberger received his M.S. in agronomy from MSU (then Montana State College) and taught many related courses. The Litzenbergers met at MSU and were married in 1941. They spent most of their lives abroad teaching increased productivity of agriculture in less developed countries .

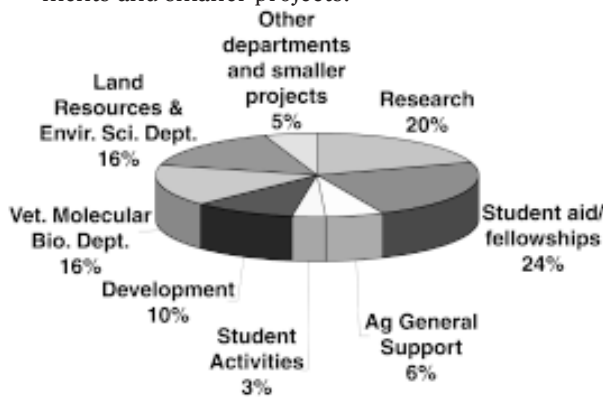
The 2001 College of Ag development board

Beau Anderson, MSU Ag Ambassador, **Bainville**; Sue Blodgett, MSU Dept. of Entomology, **Bozeman**; Taylor Brown, Northern Ag Network, **Billings**; Lynn Cornwell, **Glasgow**; Bill Davis, **Sidney**; Rachel Endecott, MSU Ag Ambassador, **McAllister**; Sandra Germann, MSU College of Agriculture, **Bozeman**; Tim Gill, Montana Livestock Ag Credit, **Helena**; Bruce Glennie, Norwest Bank, **Glasgow**; Sheila Lake, **Polson**; Leonard Lombardi, **Helena**; Stan Markuson, Stockman Bank, **Miles City**; Sharron Quisenberry, Dean, MSU College of Agriculture, **Bozeman**; Roger Sammons, **Cut Bank**; Ken Slezak, Montana Merchandising, **Conrad**; Ron Ueland, **Bozeman**.

Where Your Money Went:

Total disbursement from the MSU Foundation to the college of agriculture for 1999-2000 is **\$349,547**:

- \$70,203 Research
 - \$82,500 Student aid/fellowships
 - \$199,871 General Ag Support, broken down as follows:
 - \$20,660 Ag General Support
 - \$12,149 Student Activities
 - \$35,980 Development Activities
 - \$56,355 Veterinary Molecular Biology Dept.
 - \$55,677 Land Resources & Environmental Science Department
- The remaining \$19,050 was disbursed to the other departments and smaller projects.



Wetland Research Helps Support MSU Students

The research team that is looking into how wetlands can fight pollution includes several Montana State University students working alongside their instructors. The Wetland water treatment research has supported several MSU students and helped to generate a “bioresource” option in engineering.

Several students worked on the project as undergraduates and decided to get their masters in the area.

Deb Borden is a master’s student in environmental engineering originally from **Whitefish**. Jason Sturn, originally from **Helena**, received his master’s degree in environmental engineering in 2000. Joel Biederman, originally from **Oregon**, received a master’s degree in 1999. And Kate Riley is a masters student in environmental engineering originally from upstate **New York**.

Other graduate students supported by Stein and Hook’s research funding include: Thomas Sharp, a doctoral student in civil engineering from **Bozeman**, who graduated in 1999; Winthrop Allen, a land resources master’s student from **South Carolina**, who graduated in 1999; Janet Kowles, a MS student in environmental engineering from upstate **New York**, who is looking at the potential of a wetlands system for the Green Building Project at MSU; and Bret Towler, a master’s graduate in civil engineering in 1999, originally from **Massachusetts**.

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