The North Central Quarterly

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Agricultural Engineering Research at NCES

James J. Boedicker

This article briefly summarizes four research projects in which I am currently involved as agricultural engineer at this station. The projects reflect to some degree the diversity of engineering type problems in food and fiber production and related industries that agricultural engineers worldwide are attempting to solve.

Inlet Air Tempering in Animal Facilities

This project is directed at examining the feasibility of using automobile radiator coils as economical heat exchangers for tempering (warming) incoming air in animal confinement facilities in winter. It is being conducted in cooperation with Drs. Charles Clanton and Larry Jacobson with the Agricultural Engineering Department in St. Paul.

Animal confinement facilities must be continuously ventilated in winter at rates adequate to prevent moisture and air contaminants from exceeding acceptable levels. In many facilities, cold air enters directly from the outside, often resulting in drafts and temperature variations within the facility. Tempering incoming air alleviates these problems and the animal performance and disease problems they can cause. Newborn pigs are particularly vulnerable to unfavorable environmental conditions.

Two automobile radiator coils were performance tested last year in St. Paul and have now been incorporated into an inlet air tempering system serving one room of a two-room farrowing facility here at NCES. This system will be tested over two or three farrowing periods during the coming winter. Observations will include comparisons between the two rooms as to temperature uniformity, animal performance and total energy requirements for supplemental heating.

Wild Rice Harvest Related Studies

This project is co-led by Dr. Cletus Schertz, also with the Agricultural Engineering Department in St. Paul. Work this year has concentrated on testing of equipment and procedures for evaluating quality of combine-harvested wild rice in terms of both recovery percentage and kernel size distribution, both of which are influenced by combine adjustment and directly affect profits. Procedures being tested include both mechanical methods and a computer imaging approach for determining percentages of kernels in different length and width catagories. This research is continuing.

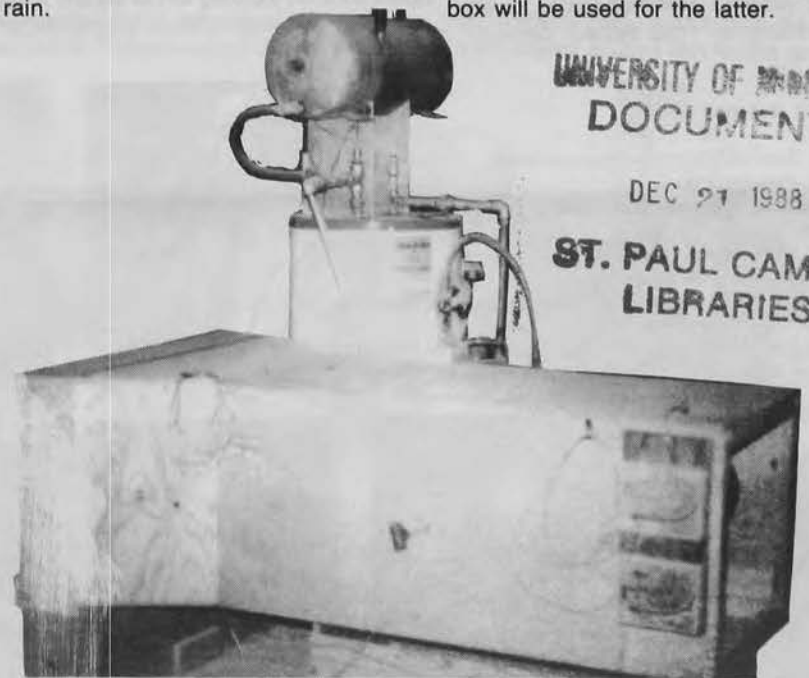
Hay Harvest Investigations

This project, also in cooperation with Dr. Schertz and others, is aimed at improving profitability of haying operations from cutting to just prior to packaging (baling, stacking, etc.). Between the time hay is cut and packaged, it can decline in value by 20 percent or more, particularly if rain occurs during this period. The decline in value results from losses of both dry matter and quality. Additional losses can occur during storage if hay is not dry enough when packaged. One way to greatly reduce these losses is to increase drying rate so as to shorten curing time and thereby limit exposure time to rain.

Research plans include examining the effects of various mechanical operations (conditioning, tedding, raking, etc.) and machine adjustments on drying rate, losses and quality. Presently, work is progressing on the development of special equipment and procedures for monitoring drying rate of hay in the field. We plan to work primarily with alfalfa and alfalfa mixtures.

Snow Mounding for Blueberry Production

This project is directed at development of equipment and methods for mounding snow onto blueberry plants to protect tissue from injury caused by severe cold. Trials conducted with semi-high blueberries by station horticulturist Dr. David Wildung and his associates have demonstrated that mounding snow onto plants lessens winter injury and enhances yields the following summer. This winter, we will be working with two approaches, one utilizing snow from between rows and the other, snow gathered off site. A self-unloading forage box will be used for the latter.



Experimental inlet air tempering system serving one room of station farrowing facility.

A Synopsis of the Minnesota Timber Supply Conference

Howard M. Hoganson

With the recent billion dollar expansions in the forest industry, Minnesota's timber supply has become a major concern. In late September the North Central Experiment Station cosponsored a two-day statewide conference on timber supply. Approximately 250 people, primarily professional foresters, attended. Over 50 presentations were made with topics ranging from specific computer modelling problems to broad regional forest policy concerns. A brief summary of some of the issues examined include:

Inventory: A statewide forest inventory has not been completed since 1977. A continued emphasis is needed on completing an inventory to provide up-to-date information for continued resource use and development plans. Through cooperation between the Minnesota DNR and the U.S. Forest Service, the interval between the statewide forest inventory in Minnesota has been reduced from 17 years to 12 years. The next inventory should be completed next year. Shorter intervals between inventories would be extremely beneficial, but statewide inventories are expensive. Satellite imagery has the potential to offer major gains for the inventory process.

Transportation and Access: Transport costs are a major component of the cost of producing timber. Forest managers often overlook this important component of the production process. Seasonal use of roads and corresponding seasonal fluctuations in supply are also of concern. Minnesota needs to develop comprehensive policy and procedure for road system development and forest access for a wide variety of forest users.

Management Information Systems: The forestry community should develop common and comprehensive data bases to describe forest management options, soil surveys, topography, transportation information and other information that is important for resource management, use, or planning.

Comprehensive Resource Analysis: A completed forest inventory is only the first step towards understanding the timber supply situation. Computer modelling offers the potential to help interpret the large amount of data and the many interrelationships between management options and the alternative resource-use and development opportunities. To provide a competitive edge for the state in achieving potential economic development opportunities, it is important that models are developed and applied in a timely manner.

New Management Options: Hybrid aspen appears to be a plausible method for increasing annual timber production. Hybrid aspen might have the potential to produce approximately the same amount of timber per acre in about half the time. Major concerns center on the cultural practices and costs needed to establish stands and the resistance of the hybrids to disease. A current major limiting factor is the availability of seed to support large-scale operations. Other more intensive operations on existing forest stands might also be possible to increase supply. Aspen fertilization is one treatment currently being studied. Not only might fertilization increase growth, but it might also be used to shorten the rotation age. The level of future timber prices will play a major role in determining the value of some of these "new" management options. However, future prices are difficult to predict and many decisions on management to produce tomorrow's timber must be made today.

Better Utilization: The available timber supply for the more valuable timber products can be increased significantly simply by improving stand utilization. Most timber stands contain some wood that is suited for higher valued end products. In some cases the cost of sorting out the higher valued material does not cover the added increase in value, but in many cases sorting and merchandising would be profitable. It is important that these opportunities are recognized. A related aspect is the potential complementary impacts between different potential end uses. As an example, a new market for birch might add significant volumes of aspen to the market simply because many "birch" stands also contain aspen. When analyzing development opportunities it is important to consider how development will impact the timber supply for existing forest industries.

Potential New Demands: Future demands for timber are difficult to predict. In just a few recent years, aspen has gone from a "weed species" to a species for which future supplies are a major concern. With technological change we are likely to see similar increases in demand for other

Speakers:
(left to right, top row)

Bill Spinner, Supervisor Chippewa National Forest
Dave Ohms, Potlatch Corporation
Dentley Haugesag, Minnesota Department of Trade and Economic Development
(left to right, second row)
Max Fulton, Blandin Lands & Forestry
Phil Raup, Agriculture & Applied Economics, University of Minnesota
Jim Oberstar, U.S. Congressman
Jim Bowyer, Department of Forest Products, University of Minnesota
Ron Lindmark, Director, North Central Forest Experiment Station








species. Higher aspen prices are also likely to result in some shifts from aspen to other lower-cost species. These plausible events need to be recognized when developing management plans for these other species that seem relatively abundant today.

Secondary Industries: Much of the value added in the forestry sector comes from the secondary industries such as window and furniture manufacturers. Although it is possible for these industries to purchase wood from outside the region, one would expect that new or expanding industries would tend to locate near a source for their basic resource. The potential gains from expansions in the secondary industries need to be recognized when developing policies that impact statewide timber supply.

Taxation: Forest resource development is highly impacted by both income and property taxes and workmans compensation. This subject needs careful attention to insure that the long term multiple benefits of forest management and industry development are fully recognized.

Education: Most people know very little about the forestry situation in Minnesota and the importance of the forest resource for supporting the large Minnesota forest industry ($4 billion annual sales). There is a need for communication to both rural and urban citizens to help insure wise decision-making in the decades ahead.

Governor Rudy Perpich has recently appointed a Blue Ribbon Commission on Forestry and Forest Products that will seek opportunities to increase cooperation and coordination among individuals and organizations involved in the state's forestry programs. Among issues the commission will specifically address are: how to ensure a long-term timber supply for sustained and increased employment in the forest products industry; how to protect and enhance the environmental qualities of forest resources for recreation and tourism; how to raise the visibility of forest resources and products among key trade groups in order to expand and increase the markets for Minnesota's forest products; and how to improve the cost-effectiveness of the state's forest management and protection programs.

Minutes, Alumni Reunion

The North Central School of Agriculture Alumni meeting was called to order by President Tom Carpenter, on July 23, 1988, at the Sawmill Inn in Grand Rapids. Minutes of the last meeting were read by Lonny Ross, the treasurer's report was read by Jim Dethloff. There was no old business. The new business was election of officers for the next reunion. The new officers elected to the board are Tom Hopkins, Will Ahonen and Bud Lacher.

Introductions of alumni attending were made by class and show of hands. Dr. Robert Nyvall, Superintendent of the North Central Experiment Station spoke about the NCES Research Fund and foundation donations. Malcolm Hanson, class of 1957, spoke about donations also. Dr. Nyvall answered his statements and asked him to join the foundation committee. A motion was made to make a donation of $500 from the alumni treasury to the research fund. Malcolm Hanson was challenged by Robert Frick, class of 1961 and a member of the foundation committee, to match funds and direct Hanson's own contribution. Hanson accepted Frick's challenge.

Speakers were Don Dailey, Glen Swenson and Don Oyster.

The next alumni meeting will be held in 3 years, July 1991.

Drawings for door prizes donated by local merchants were held throughout the evening.

Motion to adjourn was made by Gordon Lein and seconded by Robert Frick, Jr. NOTE: A final balance of the treasury was $892.15 after the expenses for the dinner and the Foundation Gift were paid.

North Central School of Agriculture holds Reunion

Former students, faculty and employees of the North Central School of Agriculture (1925-65) attended an open house and banquet Saturday, July 23, as part of the school's all class reunion.

Close to 200 were in attendance at the Sawmill Inn dinner. Event coordinator was Alumni President, Tom Carpenter from Grand Rapids.

Josephine Prescott, a former cook at the school, received the door prize for being the eldest person at the reunion. Two others were awarded prizes for coming the farthest distances, Eilert Bendix from Panorama City, California and Don Tonneslan from North Palm Springs, California. A dance followed the alumni business meeting, with entertainment provided by Steve Pratt.

Guest speakers at the evening program were former supertintendent Don Dailey (1940-50) and teacher Glen Swenson (1951-54). Current superintendent Dr. Robert Nyvall discussed the need and utilization of the North Central Experiment Station Research Fund.

Reunions for the school are held every three years. Please contact the North Central **Quarterly** if you would like to be placed on the alumni mailing lists for the reunions.

Attending the All Class Reunion for the North Central School of Agriculture are event coordinator Tom (left) and Gail Carpenter, Grand Rapids; instructor Ken and Emily Miller, Waseca; alumnus Wayne and Ethel Mills, Grand Rapids; and former superintendent Donald and Irene Dailey, Atwater, Minnesota.

Superintendent Quarterly Report

We have had a very unusual summer; first we were too dry then we were too wet. While the rest of Minnesota continued to be on the dry side we were on the wet side. In most parts of the state forage is in short supply; however, we have had ample forage for our livestock and have ended up with a surplus. Our only serious livestock feed problem has been the increase in the price of corn and soymeal. To date this has not been as high as anticipated.

Our field and research plots fared relatively well with the exception of some forestry plots. We are able to irrigate many of our horticulture and forestry plots so these survived. However some tree seedlings dried up from the extreme heat. Other forestry plots that we were not able to irrigate were almost a total loss. Our agronomy plots did relatively well except for small grains. Our alfalfa nematode plots did very well this year as did many of our alternative crop plots.

Remodeling in our building continues slowly but surely. We will have a new classroom, a small library/meeting room and an enlarged Superintendent's office. Hopefully we'll be moved in by Thanksgiving. We are planning to make some improvements in our main office during the winter.

Dr. Dave Wildung spent a month in China at Jilin Agricultural University. Dave was invited by the Chinese to help them with their research on blueberries. We at the station are proud of Dave's work and the recognition given him by this Chinese invitation.

Speaking of research accomplishments, Dr. Dave Rabas spoke to the Grand Rapids Chamber of Commerce about his and Dr. Jim Boedicker's work on ash from the Blandin CoGeneration plant being used as a fertilizer and lime substitute. The talk, illustrated with slides, was very well received.

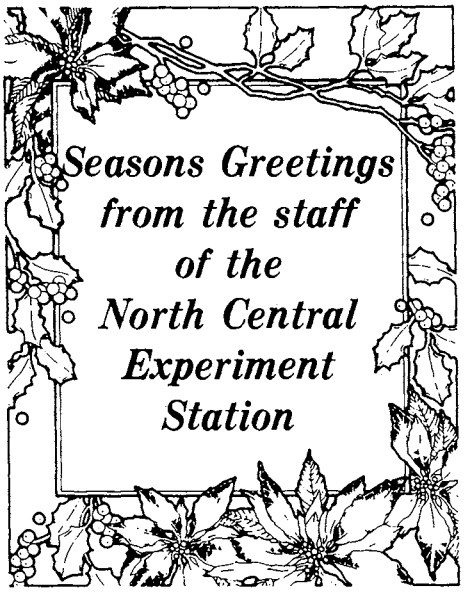
Russell R. Namchek, automotive mechanic at North Central at the time of his retirement in 1986, passed away on October 21. Russ began his employment here in April 1965 and retired in April 1986. He was a frequent visitor around the shop area after his retirement and will be missed by his former workmates. Our sympathy to his wife Alberta and family.

Dr. Raymond Porter, a recent graduate from Cornell University, has joined our staff to work on a post doctorate in wild rice breeding. Dr. Porter, his wife and two children live in St. Paul, but Ramie (as he wished to be called) does most of his work in the Grand Rapids area and on the Experiment Station. Ramie is scheduled to be on our staff for the next two years and will be working on shattering problems and other agronomic experiments.

An unfortunate incident occurred when vandals released several of our cattle. Not content with this mischief, the perpetrators killed a calf. Two suspects have been caught by the Sheriff's office and they will be charged with cattle rustling. The suspects were caught with the help of Doug Hendrickson and Darin Huot, two station employees.

A new 100-horsepower John Deere tractor was delivered to the Station. This represents the first new field tractor we have purchased in several years. Looking at the price, I fully understand why.

Finally we have had a beautiful fall. The Station flowers were gorgeous but are now gone. Preparations for winter are underway. We wish everyone Happy Holidays!



COMING EVENTS

Dairyman's Day	Thursday, January 12, 1989 10 a.m. - 3 p.m., Fireside Inn, McGregor
Beef Cow Calf Day	Wednesday, January 25, 1989 7 - 9 p.m., Grand Rapids
Visitors Day	July 20, 1989
Horticulture Night	August 30, 1989

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Superintendent

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