Look What Has Happened in 100 Years

The University of Wisconsin-Madison's College of Agricultural and Life Sciences is 100 years old.

On April 6, 1889, an act of the legislature directed the university to establish a college that "shall embrace instruction and experimentation in the science of agriculture and in those sciences which are tributary thereto."

But the college's roots go deeper. The University had offered agricultural classes for more than 20 years. It had established a campus experimental farm in 1866 and appointed its first professor of agriculture — W.W. Daniells — in 1868.

But Daniells had trouble attracting students and had only one graduate from his department. Admission to the University required high school graduation — something few farm youths had. Those who did were more likely to be attracted to medicine or law.

A lot of people weren't happy with the University's agriculture program, including members of farm organizations, farmer-Regent Hiram Smith, and even Daniell's successor, William Arnon Henry, who came to the job in 1880. In 1884 they launched a movement to establish a separate institution for agriculture. That movement ended in 1889 when the University was reorganized into colleges, including the College of Agriculture.

Henry worked closely with Regent Smith and W.D. Hoard to make University activities relevant to farmers. Together they convinced the legislature to provide research funds in 1881 and to establish the Agricultural Experiment Station in 1883. In 1885 they started the Farm Short Course, and soon after, Farmers' Institutes.

They gained an ally when Thomas Chamberlin was appointed the University's new president, who gave more support to the University's programs in agriculture and engineering.

In 1891 Chamberlin appointed Henry as the first dean for agriculture.

Research Boosts Enrollments

But undergraduate education in the new college wasn't an immediate success. That changed, surprisingly, because of an early research success. Henry had hired Stephen Moulton Babcock as a chemist in 1888; just two years later, Babcock perfected his famous test for butterfat, which put dairying on a scientific basis. Babcock's Dairy Schools, set up to show dairy plant personnel how to use the test, were an immediate success. Some 10 years later, with a new agricultural career open to them, students began enrolling as regular students in the four-year course.

Henry was succeeded in 1907 by Harry L. Russell, who quickly set about reorganizing the college. In his first few years he established eight new departments: poultry science, agricultural economics, agricultural education, plant pathology, entomology, genetics, agricultural journalism and bacteriology.

Russell hired Noble Clark to supervise research administration. The University's famous vitamin research flowered, the cabbage breeding program got underway, and bacteriologists made great strides in studying nitrogen fixation. The new agricultural economics department introduced the study of farm management, land economics, rural social problems and even wildlife management.

Extension Comes Aboard

Formal extension work began during Russell's administration with a 1909 state appropriation of $30,000 and hiring of the first county agricultural agent, E.L. Luther in 1912. In 1914, federal legislation established the Cooperative Extension Service.

Russell left the deanship in 1931 to head the Wisconsin Alumni Research Foundation and was succeeded by Chris Christensen, an agricultural economist who had been executive secretary of the Federal Farm Board and a U.S. Department of Agriculture economist before that.

Christensen brought new innovations to the Farm Short Course and established the college's Artist-in-Residence program by hiring John Steuart Curry. The college's natural resource efforts flowered during his administration. The Upper Mississippi Valley Soil Conservation Station was opened at La Crosse, the Coon Valley Watershed conservation plan was established as the first in the nation, the University arboretum was established, and the department of wildlife management was created.

Plant breeders released Vicland oats and Wisconsin's first corn hybrid, and researchers developed the first practi-

(Continued on page 33)

In 1908 campus ended at Ag Hall and Picnic Point was out in the country.

(Continued from page 31)

This early food processing class stirred up delectables on the second floor of the college's heating plant.

cal soybean oil meal rations for livestock and poultry. The state's first Dairy Herd Improvement Association was formed, as well as the first artificial breeding cooperatives, and Wisconsin biochemists worked out methods to preserve bull semen.

Agricultural economists published on principles and practice of organizing cooperatives, and worked out the first rural zoning ordinance in the nation for Oneida County.

A Silver Lining in Spoiled Hay

Biochemists identified nicotinic acid as a pellagra preventive and found that spoiled sweet clover hay contained a chemical which would later be developed into a medical blood clot preventive and the world's best rodenticide. Bacteriologists began developing methods for mass production of penicillin which dramatically increased the supply of the drug badly needed in wartime.

When Christensen resigned in 1943, E.B. Fred, a bacteriologist working on nitrogen fixation, took over until he was appointed University president in 1945. Another bacteriologist, Ira Baldwin served as the next dean, leaving three years later to become vice-president under Fred.

Under Fred and Baldwin, the University began experiments in irrigation in the central sands area which eventually resulted in the reclamation of a former wasteland into a productive vegetable crop production area.

Agricultural engineers began experimenting with loose housing for dairy cattle, the normal method of housing cattle today, and invented a mechanical tree planter which kept the state's reforestation program going strong in spite of a severe labor shortage for continuing the work.

During this time, Joshua Lederberg in genetics made his observations of sexual processes in bacteria, for which he received the Nobel prize some ten years later.

Rudolph Froker, a dairy economist who had developed a system for paying for milk on the basis of non-fat solids, served as dean from 1948 to 1964. Research funding increased greatly during Froker's administration. Warfarin rat killer was perfected, the first embryo transplants were made, and the first sterile concentrated milk was developed.

Wisconsin veterinary scientists developed a detection and vaccination method for brucellosis that essentially wiped out the disease in five years. Grassland farming got a big boost from a well-coordinated campaign, as well as from release of the Vernal alfalfa variety, development of a three-cut management system, the Sure-Fire Alfalfa campaign, and machinery developments such as hay crushers.

The Land Tenure Center was established in 1962, and the Arlington Research Station was purchased in 1955. First experiments with no-till corn were conducted and the Pacemaker's Corn Club showed farmers how to double corn yields.

The College Gets A New Name

Plant pathologist Glenn S. Pound was appointed dean in 1964. Pound's tenure saw several important administrative changes — extension work was taken out of the college, and the University of Wisconsin System was created. The college became the College of Agricultural and Life Sciences, accompanied by a complete overhaul of the curriculum.

The Food Research Institute moved to the college from Chicago, and the School of Natural Resources was established. The metabolically active form of vitamin D was identified and later used to treat milk fever in cows, and experimentally to treat human bone disorders. The second Wisconsin scientist to get the Nobel Prize — biochemist Har Gobind Khorana — synthesized the first gene in 1970.

Landscape architects started working with Wisconsin towns on historical preservation and other types of community improvement, starting with Bayfield in the early '70s. A few years later, they developed "Old World Wisconsin" at Eagle.

A non-surgical technique for transferring cattle embryos made the process much more practical.

The College To Come

Soil scientist Leo Walsh became dean in 1979. The ensuing ten years have been some of the most exciting, and most troubling, that the college has experienced. While CALS researchers scored some tremendous successes, the farm and rural sector faced severe economic problems.

In 1931 students were proud to pose with the cutting edge of farm technology.

The 1980s have seen the rapid development of biotechnology, with many key advances made on the Madison campus. In 1980 UW-Madison horticulturists were able to clone a plant gene, and six years later were the first to insert a gene for herbicide resistance into a woody plant.

In 1981, animal scientists successfully matured and fertilized cattle eggs outside of the cow's body — a key step in the search for ways to multiply genetically superior cattle. In 1987, researchers were able to clone calves by transferring nuclei from multi-cell embryos to one-cell embryos. The same year, agronomists began experiments on alfalfa to change plants into "biochemical factories" able to produce industrial enzymes.

But much of the college's attention has been focused on the financial stress that has plagued farmers and rural communities.

There are no simple or quick solutions. CALS faculty and staff have worked long hours helping farmers find ways to cut costs, improve efficiency and pay down debt. More than ever, interdisciplinary efforts have become important.

For example, animal scientists have teamed with economists to create software and worksheets that let farmers calculate their best feed buy, or to find their best option under various government farm programs. Rural sociologists, dairy scientists and economists have attempted to predict the consequences of technologies such as bovine somatotropin. Social scientists in various fields have worked to help rural communities revitalize their economies.

The need to cut farming costs, coupled with environmental concerns and farmers' desire to minimize their use of pesticides, have generated a great deal of interest in low-input, sustainable farming.

These trends — biotechnology, improving farm profitability, low-input agriculture — will doubtlessly be major themes as the college steps into its second decade.

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EXTENSION SERVICE CELEBRATES 75 YEARS

Anyone who grew up on a farm and was in a 4-H club as a kid has firsthand experience with Extension and Extension agents. So do farmers themselves, businessmen and engineers. And golf course superintendents. Nearly everyone in our country has benefited greatly from the help and counsel and advice of the Cooperative Extension Service.

Have you ever had Dr. Gayle Worf come to your golf course to help with a particularly difficult turfgrass problem? Did you ever question him (or Dr. Newman or Dr. Kussow) at the WTA Summer Field Day or at the UW Turfgrass Conference or over the phone? Their help comes courtesy of the Cooperative Extension Service. The same is true for many of the other faculty members whose help you need from time to time. Did you ever watch WHA-TV or listen to WHA radio? They are the Extension Service at work. Extension has made the lives of all Americans, either directly or indirectly, both easier and better.

Extension is one of the ways our University of Wisconsin shares her research with the citizens of the state. The Cooperative Extension Service is 75 years old this year. But in our state, it got an earlier start. Back in 1890 Steve Moulton Babcock shared his development of a test for butterfat content in milk with the dairy industry. In 1908 the UWEX initiated a health project to prevent tuberculosis by educating school kids and adults about the hazards of this disease.

May 8th marked the official anniversary of the Cooperative Extension Service on a national level. Coop Extension programs began in 1914 with the passage of the Smith-Lever Act. But Extension's roots in other states, as well as in Wisconsin, are much older than that.

Probably the first U.S. organization to informally distribute information on agriculture was the American Philosophical Society which was founded in 1743. One of the founders and a longtime leader of the society was Benjamin Franklin. Informal learning activities became much more systematically organized through agricultural societies. The first of these was organized in Philadelphia in 1785. This movement prospered and flourished for 75 years and reached a peak about the time the Civil War started.

State legislators also advanced informal agricultural education by establishing state boards of agriculture. The first was New York's, founded in 1819. These state boards were primarily responsible for establishing one of today's Extension's most direct predecessors — farmers' institutes. These usually lasted from one to five days and dealt with a variety of topics.

Opportunities for formal learning in agricultural sciences were extremely limited in early America. Most colleges through the first half of the 19th century offered few, if any, courses related to agriculture. Most of them were private colleges offering a classic based curriculum most likely patterned after the centuries-old examples of Oxford and Cambridge.

A few years ago I wrote a piece about a man I consider a real hero among American agriculturalists — Justin Smith Morrill. As a Vermont Congressman, in 1857 he introduced a land-grant college bill. Five years later, in 1862, President Lincoln signed the bill into law (on July 2). The Morrill Act provided for at least one college in each state, ". . .where the leading object shall be, without excluding other scientific or classical studies, to teach such branches of learning as are related to agriculture and the mechanical arts."

The legislation provided a number of 30,000-acre land grants to each state equivalent to the number in each state's congressional delegation. The lands were to be sold, 10 percent of the proceeds used, if necessary, to purchase a college site, including an experimental farm, and the balance was to be permanently invested at five percent interest. What a brilliant piece of legislation by that Vermonter.

The Morrill Act was part of 1862's "bumper crop" of agriculture-related legislation. Only a few weeks before signing the land grant act, Lincoln signed two other historic and important bills. On May 15, he signed the Organic Act which created the United States Department of Agriculture (USDA), an action that had been proposed 70 years earlier by George Washington.

The other bill, signed five days later, was the Homestead Act. That law made available to the public millions of acres of land at virtually no cost. Immediately land prices dropped, speculation was widespread and the result for the new land grant colleges was meager endowments.

Morrill almost immediately began a campaign in the Congress for additional endowment funds, but it wasn't until 1890 that another bill was passed that assisted in solving this problem.

Establishment of Agricultural Experiment Stations was another milestone in the development process that ultimately led to Extension's emergence. Experiment stations had long been in existence in Europe when, in 1875, Wilbur Atwater established our country's first at the Wesleyan University in Middletown, Connecticut. Later, Atwater became the first director of the Office of Experiment Stations in the USDA.

Legislation was introduced in Congress in 1882 to establish an Experiment Station at one land grant college in each state. It wasn't until 1887 before such a bill, sponsored by Missouri Representative William Hatch, was signed by President Grover Cleveland. Members of the Wisconsin Turfgrass Association have heard Dr. Worf speak of research work paid for from "Hatch" funds. Now you know where that phrase comes from. The Hatch legislation firmly established research as a recognized function and mission of the land grant colleges and universities.

Two New Englanders were early pioneers actively involved in Extension-type efforts. They were Kenyon L. Butterfield, president of the Massachusetts Agricultural College, and Seaman A. Knapp (a Vermonter) of the USDA. Their views on how Extension should be administered were very different. Knapp advocated "cooperative farm demonstrations" directed by the USDA

through its field agents, while Butterfield urged a system of "agricultural college extension" planned by the states and including farm demonstrations as one of several methods.

Butterfield suggested "pecuniary aid by the national government to land grant colleges for agriculture Extension work." This was the germ of the idea which 17 years later resulted in creating the Cooperative Extension Service through passage of the 1914 Smith-Lever Act.

Knapp firmly believed that observing farms operated at public expense wasn't likely to motivate farmers to change their operating methods. In his opinion, diversified agriculture and other desirable changes would come only through demonstrations conducted by farmers themselves on their own farms under ordinary farm conditions. In Knapp's words, "what a man hears, he may doubt, but what he does, he cannot doubt. . . . "

A bill filed in December of 1909 to finance Extension work by the agricultural colleges was the first of 32 such bills ultimately submitted. South Carolina Congressman A. Frank Lever put his in the hopper on June 2, 1911. An amended version of Lever's bill was introduced in the Senate more than a year later by George Hoke Smith. Nearly two more years passed before the Smith-Lever bill finally was passed. President Woodrow Wilson signed it on May 8, 1914.

The Smith-Lever Act provided for mutual cooperation of the USDA and the land grant colleges in conducting agricultural Extension work. It specified that the work ". . . shall consist of the giving of instruction and practical demonstrations in agriculture and home economics to persons not attending or resident in said colleges in the several communities, and imparting to such persons information on said subjects through field demonstrations, publications and otherwise. . . . "

The vision of these early agricultural leaders in Congress and their dedication to the cause of education has been beneficial to golf course management for generations. Their tight hold to an ideal has given us the chance to know and learn from educators like Dr. Worf. This birthday year of Extension is worthy of celebration!

— MSM

JACOBSEN HOLDS 22nd ANNUAL COLLEGE STUDENT SEMINAR

Turf students Todd Monge of the University of Wisconsin (seated) and Glenn Perry of the University of Rhode Island (right) are shown in the accompanying photograph discussing Jacobsen's LF-100 Fairway Mower with Training Manager Ralph Sylvester during the 22nd annual Jacobsen College Student Seminar held in Racine May 21 through May 25. Monge and Perry were among the thirty-six students who attended this year's program.

Curt Larson, general manager of Wisconsin Turf Equipment Corporation, talked about the subject of "what golf course superintendents should expect from their distributor" with the students.

Adding to the 1989 seminar's distinctive Wisconsin flavor was a trip to Milwaukee County Stadium to hear from Harry Gill before watching the Brewers play a night game. They toured Racine Country Club and were hosted by WGCSA member Mike Handrich. In addition to a Jacobsen factory tour, they "toured" Lake Michigan aboard a cruise boat. Kent Kurtz of Cal Poly Tech made what has been an annual trip for him to Racine. John Piersol, an instructor at Lake City Community College, lectured on the subject of realisms of the working world.

Jacobsen staff members were included throughout the program. Students heard from familiar names like Brinkman, Reid, Krick and Sylvester, among others.

As recorded in the "Editor's Notebook", former Wisconsin residents Danny Quast and Bill Roberts came "home" for the chance to address future members of our profession.

Jacobsen sponsors the seminar as part of the company's continuing commitment to golf industry education. As we know, that commitment also includes generous support of the NOER CENTER and annual monies dedicated to the GCSAA Scholarship and Research Fund.

— MSM

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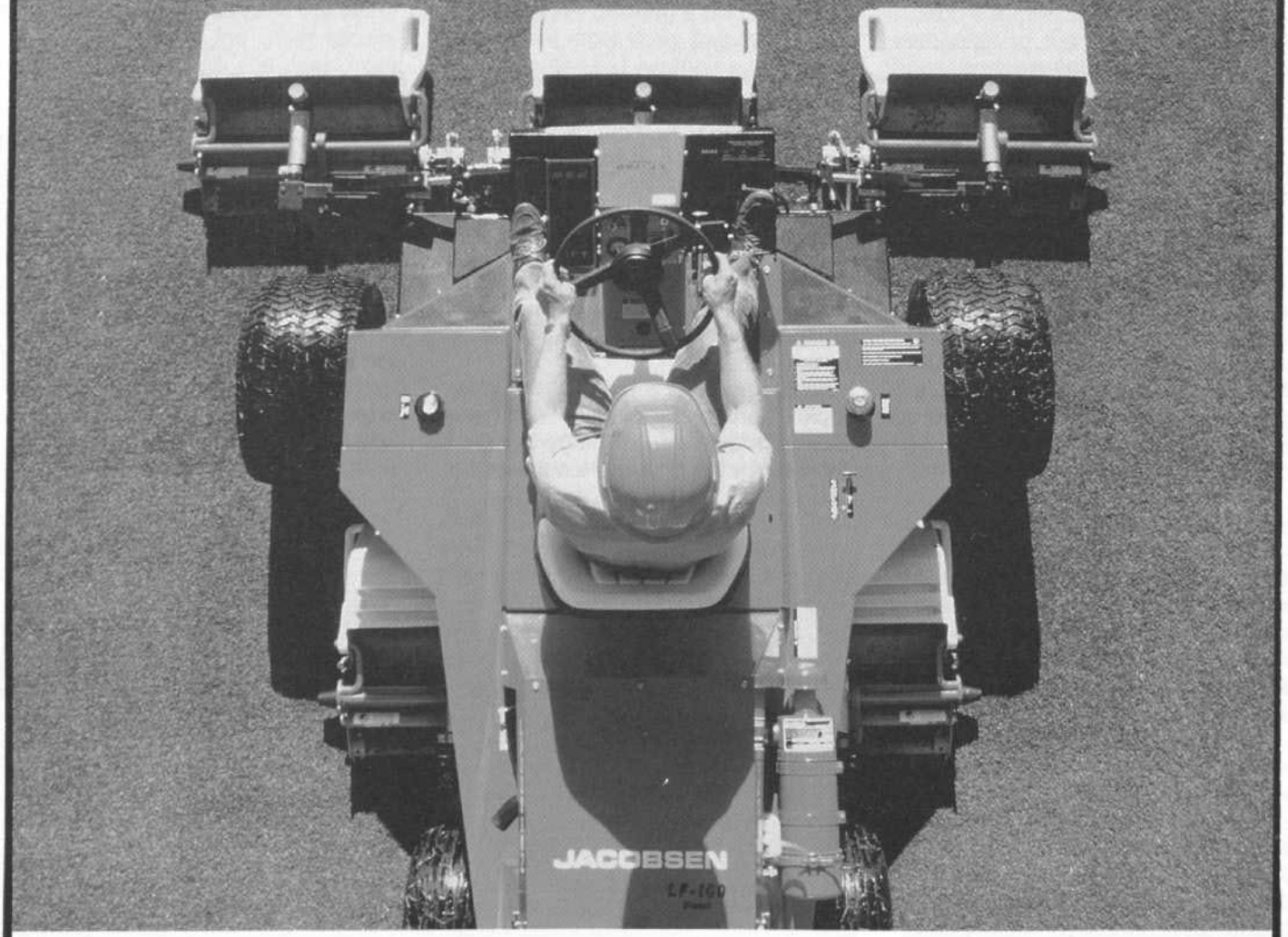

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Inorganic Compounds as Fungicides for Turf Disease Control

By Dr. Gayle Worf

In the classification of fungicides I shared with you earlier, I listed several inorganic compounds first. These included sulfur, copper, mercury, chromium and cadmium containing compounds. Inorganics were the first compounds used to control diseases (and insects). That's understandable, since organic chemicals are a product of innovations of modern chemistry dating back no more than 50 years ago. (When you reach my age, that seems rather recent!) With the recycling of concerns about modern pesticides, some say we should be dusting off these old compounds and giving them a second look.

"Sulfur, under the right circumstances can burn, especially if the temperature and humidity go up at the wrong time."

What about sulfur for turf? It's cheap, and it's liked by organic gardeners. There are several formulations. Elemental sulfur, which has been "micronized", or more finely ground, to enhance activity, is the most common form. Organic sulfur products have been manufactured to reduce phytotoxicity and to enhance penetration of fungal spores. And there's lime-sulfur, a really old timer still used occasionally as a dormant fungicide, and especially as an insecticide.

We've used elemental sulfur in the greenhouse for powdery mildew. We also included several sulfur formulations as additions to other fungicides in necrotic ring spot control trials in the early 1980's. We got some encouraging results upon occasion, but we also got injury with about the same frequency. We never could tame it. Sulfur, under the right circumstances can burn, especially if the temperature and humidity go up at the wrong time. And of course, Joe Vargas' recent work suggests continued sulfur applications may enhance black layer problems. So our feeling is that sulfur is best left to other uses, as a fertilizer when needed — but not as a turf fungicide.

Coppers are worse than sulfur for phytotoxicity on grass. One of the most dramatic photographs I have in my file was taken in 1981 in Kenosha County. It was of a home lawn in a cul-de-sac of new homes where necrotic ring spot was seemingly marching up the street, attacking all turf in its path. So one homeowner, anxious to be spared its wrath, went down to the local farm supply store, told his story, and was sold some potato fungicide material. It turned out to be copper sulfate, a compound of Bordeax mixture. I suppose you could say the treatment worked, since NRS didn't develop. NRS does not attack dead grass!

Even coppers with safeners in them cause damage to corn, another grass plant. And at the rates we would have to use them, we'd soon accumulate enough in the soil to become phytotoxic, like some tobacco seedbeds which have been abandoned, for instance. So coppers are not a choice.

Cadmium and chromium-containing fungicides were quite important 30 years ago. They're especially good on dollar spot, and they enhance a good overall turf appearance. But they are alleged heart irritants and known carcinogens. They're banned in Wisconsin and one other state (California, I believe). I don't believe they should be used in today's agriculture.

That leaves mercury. Mercuries were the mainstay fungicides for greens use — winter and summer — from the 1920's until they got into trouble in the 1970's. After a see-saw battle which saw them totally banned, then reinstated, and finally limited to winter disease control on tees, greens and approaches, they remain with us for these purposes, since an August 26, 1976 EPA ruling. The more toxic and cumulative forms are the organic mercuries, ethyl and methyl mercury formulations, which were totally banned at that time. Although phenyl mercury (an organic formulation) remains, our primary use for serious snow mold situations are the inorganics Calo-clor and Calogran. These are mixtures of inorganic mercurous ("insoluble") and mercuric ("soluble") chloride.

I'm told that the state of Michigan is now revisiting mercury's status, with an eye towards banning all forms of it. (Such concerns are contagious among states — will Wisconsin catch the concern from Michigan?) Their apparent concern has to do with its getting into surface and ground waters. That question was examined in the 1970's, but such data is never complete. Some work by Dr. Jack Lebeau at The Banff Springs golf course, which had treated annually with 6 ounces of mercuric chloride for about 35 years. After sampling by 6 and 12 inch increments to a depth of three feet, he found most of the mercury in the first 6 inches, 10 percent in the next 6 inches, and only trace amounts below. His conclusion, supported by sampling done elsewhere, was that even on well-drained golf greens mercury remains in the upper horizons and does not move into waters. The 25 foot barrier from greens to water required by the label should prevent contamination while applications are made.

"His conclusion . . . was that even on well-drained golf greens mercury remains in the upper horizons and does not move into water."

One reason we've continued to look at snow mold control alternatives is the specter of their ultimate loss. A lot of materials have some effectiveness. Perhaps they could be made more effective by "packaging" them in slower release units of some kind.

In summary, then, the inorganics and heavy metal-bearing organics have been replaced with present-day organics because the new products have: (1) extreme efficacy — much smaller amounts are required; (2) usually safer to crops; (3) probably safer to the environment and man; and (4) generally more degradable.

In another issue we'll continue our discussion on modern fungicides.

NOER CENTER NEWS

O.J. NOER CENTER for TURFGRASS RESEARCH Honor Roll

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Dole Fresh Fruit Company
Devil's Head Lodge
Bulls Eye Country Club
Margaret L. Bell
Bay Ridge Golf Course

ONEIDA JOINS WITT IN SUPPORTING THE O.J. NOER CENTER for TURFGRASS RESEARCH

The officers and directors of Oneida Golf and Riding Club followed the good example of their golf course superintendent Randy Witt and voted to give $3,000 to the O.J. NOER CENTER project over the next three years. Witt made his personal donation earlier this year.

Oneida, through this pledge, joins a number of other state golf clubs in the *Medalist* category of doors to the UW Foundation. Once again, the golf course superintendent played a key, critical role in moving a major golf facility in the direction of research and education.

Thanks to Randy Witt and all the members of Oneida.

RACINE COUNTRY CLUB PLEDGES

Mike Handrich has been a busy guy assuming the duties involved with managing one of the finest golf courses in Wisconsin. But he's had time to request support from Racine C.C. for the O.J. NOER CENTER. After his presentation, the club officials voted to pledge $1,000 per year for a three-year pledge period, joining a growing group of golf clubs recognizing the need for a turfgrass research facility in our state.

As one of the club officials told Mike, "a club of our stature needs to be involved in projects like this one. It's for our own benefit."

Well said.

SHEBOYGAN PINE HILLS COUNTRY CLUB BACKS THE NOER CENTER

Rod Johnson has served as a WTA director. He has hosted a WTA golf outing. He's never missed the winter conference, the summer field day or the golf outing fundraisers. That's an impressive record of dedication. Now he's added to it. His employer, the beautiful Pine Hills C.C., have made a major donation to the NOER CENTER for 1989, and Rodney feels confident that the same gift level will continue for the following two years. That moves the NOER CENTER $3,000 closer to reality.

WAUSAU COUNTRY CLUB LENDS A HELPING HAND

Lon Roberts and Paul Steinlage, members of the Wausau C.C., encouraged their club to extend help to the NOER CENTER project. The result of their efforts was a one-time gift to the research center on the new UW-Madison golf course. Thanks.

WSGA COMMITS $5,000 TO THE NOER CENTER

The annual spring meeting of the Wisconsin State Golf Association provided some very exciting news for the fundraising program for the O.J. NOER CENTER for TURFGRASS RESEARCH.

Wisconsin Turfgrass Association director Dewey Laak attended the meeting and gave a presentation on behalf of turfgrass research and education in Wisconsin. He explained how the NOER facility fits into those efforts. The WSGA directors were listening closely. They voted unanimously to make a five year, $5,000 pledge to the UW Foundation for the NOER CENTER.

Support was in all quarters, led by WSGA past president Dr. David Cookson, current WSGA president Doc Weiske, WSGA director Bob Herzog and WSGA Executive Director Gene Haas.

As Haas said,"There are several factors that are key to a healthy future for golf in Wisconsin, and the WSGA knows the NOER CENTER is certainly one of them."

It's believed by this editor that the move by the WSGA will serve as a catalyst for individual golf clubs to act in a similarly positive and responsible way.

Many Individuals Join the NOER CENTER Honor Roll

The list of individual donors to the NOER CENTER has grown since the last issue of *THE GRASS ROOTS*. Randy Smith, golf course superintendent at the Nakoma Golf Club, Norm Ray, golf course superintendent at Crystal Springs, and Mike Lee, assistant golf course superintendent at the Blue Mound Country Club made gifts to the NOER project — so did Wayne and Susan Horman. Wayne is employed in the ProTurf Division of O.M. Scott and Sons in Marysville, Ohio. Susan (daughter of UW professor Jerry Apps) is a school teacher in the Columbus area.

And speaking of Scotts, Jerry and Jo O'Donnell have *again* given to the UW Foundation for the WTA project to build a research facility. Larry and Gail Lennert, now of Sheboygan, made a generous personal, joint pledge to the Foundation — a great gesture from a couple just starting out now that college is finished. Thanks to everybody!

Many individuals contributed through the "golf ball number guess" at Reinders Turf Conference last winter. The NOER CENTER coffers grew by $328 as a result.

THREE REASONS TO SUPPORT THE NOER CENTER:

1. Turfgrass research is critical to a healthy future for golf.
2. Turfgrass research is absolutely necessary for the prosperity of your golf course.
3. Turfgrass research will add to your own security and that of your family.

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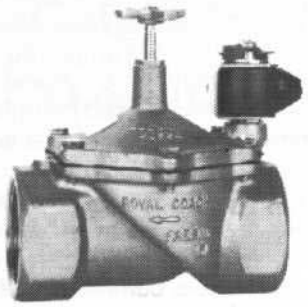
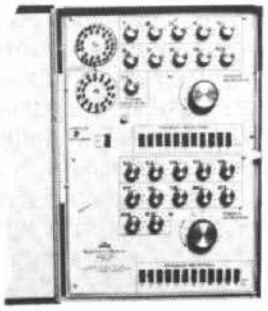
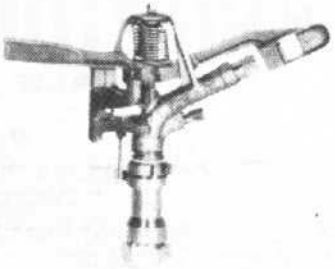


Electric Valves



Controllers



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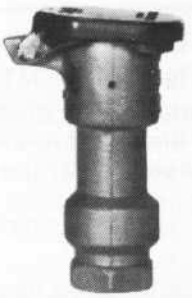

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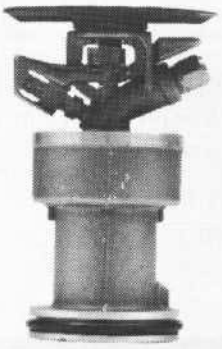

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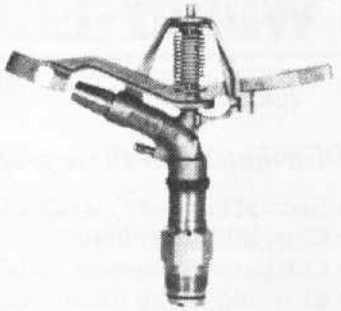

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