

(Continued from page 20)

In early May a roller was air freighted (cost of \$2,000) to O'Hare and in a week, John Ellul followed up and came here to show the machine to me. I had John talk to Jon Jones, from Chicago Turf & Irrigation who agreed to help demo the unit this coming year and see what kind of response it may have in this area.

I was really surprised and pleased to see how well it did function on rolling our greens. The machine is different in that you sit on it facing one end and it rolls left and right. The speed of the roller is really surprising for it travels at about 4-5 miles per hour with a qualified operator at the controls. It takes about 10-12 minutes to roll a 5,000 square foot green. It would be a perfect machine for rolling the greens in the spring. The machine measures 3 feet by 2 feet and has three 4½" rollers, with one roller being the drive roller. The machine weighs just over 600 pounds (or about 43 stones, as John would say) with the weight of the operator. This machine was made special for golf putting greens by being only 3 feet long instead of the normal 5 feet used for bowling greens. I foresee the use of this machine for the final rolling of tees and greens just before seeding or sodding. Then using it after the seed is spread or after the sod has knitted and needs rolling before mowing. My main purpose was to be able to roll a green and then not cut it as low as some people are now doing. At the present, I have not had the time to check it with a stimpmeter since the deadline of *The Bull Sheet* is a month before you receive it in the mail. By the time you are reading this, I will have some test data and will write another article to bring you up to date.

If anyone is interested in seeing this machine in operation you need to talk to your local sales representative from CT&I. Any other questions you may also call me.



Ismael Estrada rolling new sod at Glen Oak C.C.

A Belated Update on the Tool From Down Under

By Fred Opperman

Back in June I wrote about a roller that I had received from Australia that was built to roll golf greens. At that time I had promised to write a follow-up article since I didn't have much time to use the machine and get any data on it before the June issue went to press.

Well, since then I have been able to get some data when I used it to roll the greens at Glen Oak C.C. during the summer. I need to recap, I feel, somewhat on the description of this roller to refresh some people of what it is and what it can do.

The roller was designed first in Australia to roll bowling greens and it was built for that purpose. It was originally 5' long and about 18 wide, with two rollers. But the roller built for rolling golf greens is only 3' long and 2' wide with three 4½" rollers. Weight is about 600 pounds with machine and operator (more depending on the weight of the operator of course).

The machine rolls sideways to roll a green. You sit on it facing the length of the machine and it rolls left or right, depending which foot pedal you depress. It has a handle bar and two foot pedals and a throttle. That's all for controls. It is simple to operate, once one gets the hang of moving sideways. It is also surprising on how fast it travels across a green — 4 to 5 miles per hour I would think.

My thought of getting this machine was to roll the greens occasionally instead of cutting them down next to nothing and putting a great deal of stress on the plants. I found that after rolling a green I could increase the speed plus or minus about 24 inches on most readings. I was also concerned about compaction of the greens, so I borrowed a penetrometer from Jim Latham of the USGA Green Section.

The use of this instrument is all relative. One has to get the feel of it and take many readings over a period of

time to see if there is a difference. I found that it increased the compaction by about two numbers after rolling. For example, if the reading was a 7 before rolling, after rolling it showed a 9 or a 10. The next day the reading on the penetrometer was a number or two lower. Also, the stimpmeter reading had fallen off from the high of the day before, but it was still 10 to 12 inches faster than a green that had not been rolled. By the third day after rolling, the speed of the rolled greens were the same as the other greens which had not been rolled.

The uses I foresee of this machine are not just for faster greens. It can also be used during construction of greens or tees. When it comes down to the final rolling, this roller could be used before seeding or sodding and then again after seeding or sodding to roll the seed or sod for better contact with the soil. In the Spring of the year most northern courses roll their greens before cutting to smooth them out. This roller would work fine, for it is fast, doing a 5,000 square foot green in under 10 minutes. Another use would be rolling the greens after core cultivation. This rolling would help smooth the surface of the greens and return some of the speed that was lost due to core cultivation. The roller would work well on tennis courts or croquet courts just as well as it does on a golf or bowling green.

I look at this machine as just another toll in our inventory needed to keep pace with the demands of our jobs. Just as we have coring machines, turf groomers, and top dressers, a roller is another tool to be used to do a critical, required task.

If you would like more information on this machine, give me a call at (312) 858-0601 or call a Chicago Turf & Irrigation (312) 773-5555 salesperson for they are showing the machine around various courses.



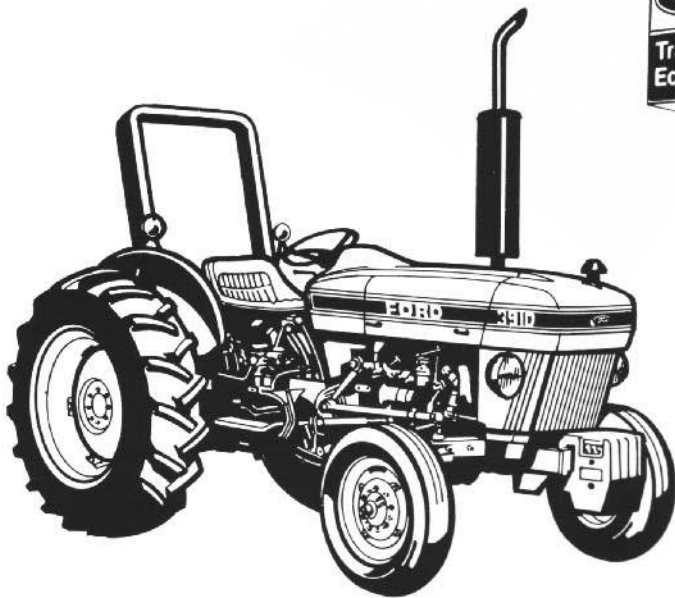
Dr. Bill Daniel trying his skills at rolling a green at Glen Oak C.C.

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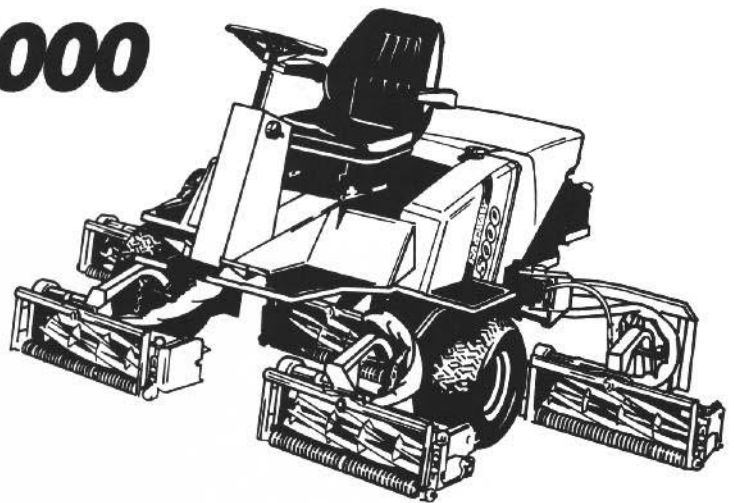
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GCSAA Recognizes *The Grass Roots*

For the sixth consecutive year, the Golf Course Superintendents Association of America has awarded our WGCSA newsletter in their chapter newsletter contest. The letter notifying us of this award is reproduced here for your enjoyment and satisfaction.

The editor gets the letter telling of the award; scores of others deserve and get the credit.

One of the great strengths of our chapter publication is the stable of writers whose bylines appear every issue. Those people, notably Worf, Kussow, Schultz, Johnson, the UW students in the turf program, the "Prez" (whoever has the title at any given time), Latham and Miller.

Then there is the special group sharing their talents in a couple of issues each year — Koval and Pellitteri, Cookson, Erdahl, Kienert, Schwab and Newman.

Finally, all of those who contribute on an annual basis add enormously to what is really a wealth of information over the course of a year.

One of the great things, to the editor at least, is that WGCSA members receive *The Grass Roots* for free. No charge. We owe a lot to those who pay for its publication. Our advertisers keep the flow of information going. I think of that and thank them when each issue hits the newsstand.

Not enough people are aware of how much care is given to each issue by the staff at Kramer Printing. Their shop has a lot of craftsmen (and women) from Ben Franklin's mold, ink stains and all. They are as proud of each issue as I am. Their work is greatly appreciated by this editor.

Many question the need for contests and awards, but I don't. I think they are fun. This one in particular inspires me to do my part the best I'm able. Peer recognition for all of us is something special. And winning is especially nice. We don't enter with the thought of losing; contests inspire a winning attitude.

And again this year past, Wisconsin was a winner.

December 18, 1989

Mr. Monroe Miller
Blackhawk Country Club
P.O. Box 5129
Shorewood Hills
Madison, WI 53705

Dear Monroe,

It gives me pleasure to formally advise you that the publication you edit has won the Best Original Editorial Content category in the 1989 GCSAA Chapter Editor's Contest.

The announcement will be made in the January issue of GCM and Newsline, and at the opening session of the 61st GCSAA International Golf Course Conference and Show on February 22, 1990, in Orlando, Florida. Plaques will be presented at the Chapter Editor's Seminar March 29-30 in Lawrence, Kansas, or they will be sent to editors who are not in attendance. Details on the seminar are forthcoming.

Again, congratulations, and keep up the good work!

Sincerely,

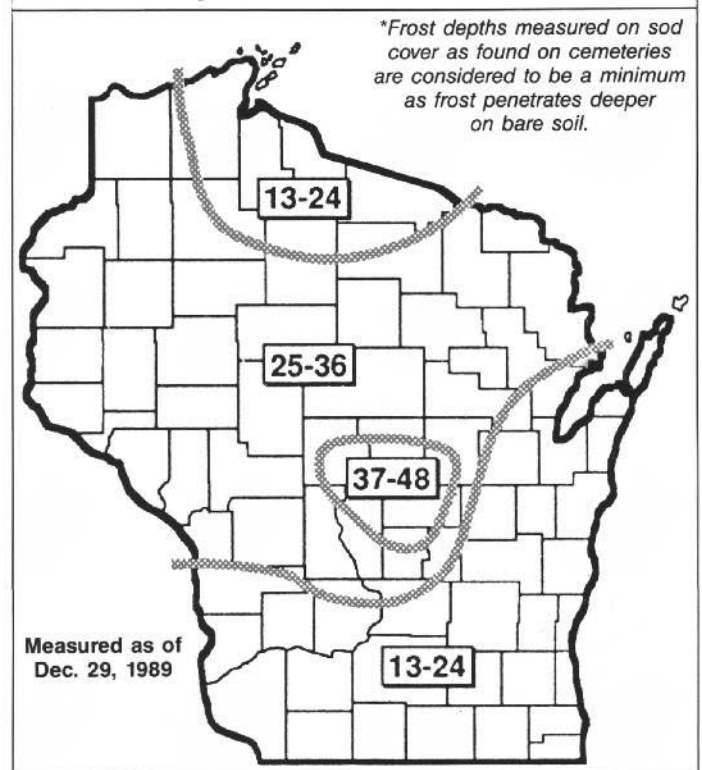
Clay Loyd
Director of Publications

CL/kmt

P.S. If you requested an evaluation of your publication by the judges, that, too, will be along shortly.

Frost Penetrates To Record Depth

Frost Depth In Inches*



Source: Wisconsin Department of Agriculture

For the second month in a row, bitter cold weather has produced record depth frost.

Surveys collected by the Wisconsin Agricultural Statistics Service indicate the average frost depth in the state is 24.3 inches, nearly 10 inches deeper than the previous record of 14.6 inches set in 1980-81.

The reports are collected from gravediggers who report not only record frost depths, but abnormally dry soils.

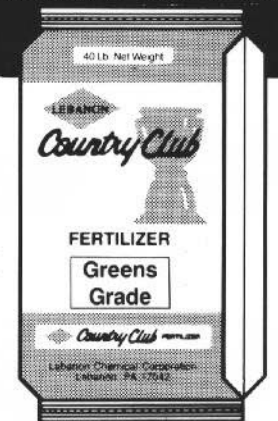
The deep frost means that water will have more difficulty seeping into the ground this spring when the snow melts, said Roger Stewart, an agricultural statistician.

The average snowfall in the state was 4.3 inches. But before the snow will provide insulation for the earth and prevent the frost from plunging deeper, the snow depth needs to be about one foot, Stewart said.

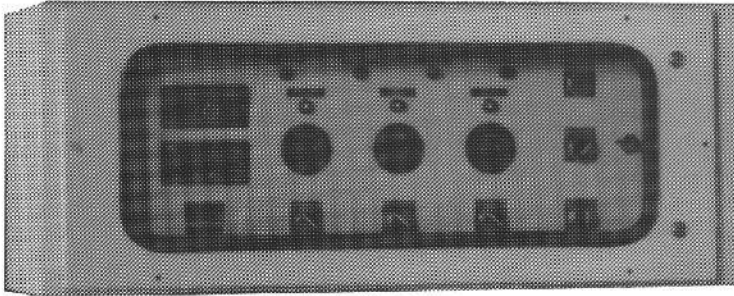
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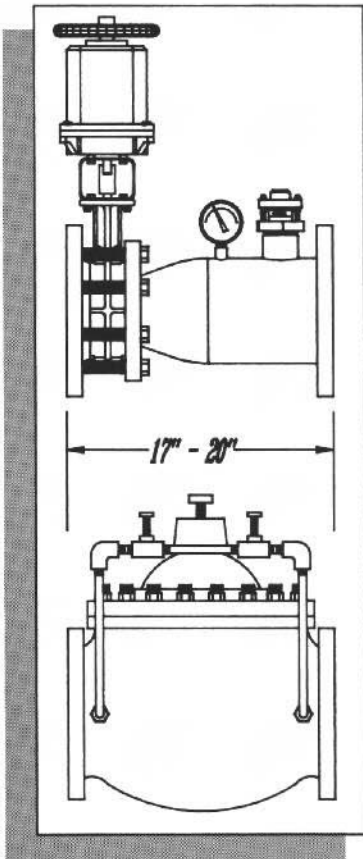
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Should Mercury-Containing Fungicide Use Be Continued?

By Dr. Gayle L. Worf

Department of Plant Pathology and UWEX
University of Wisconsin-Madison

In the last *The Grass Roots* we discussed the issues surrounding the EBDC's. Their political fate is yet to be determined. (*Note addendum below.) Presently there is a special review underway to determine whether mercury-containing fungicides will continue to be available for snow mold control around the country, including Wisconsin.

I'm sure you will agree that it is increasingly important for us to know considerable detail about the chemicals we're using on the golf course for disease control. We already are acquainted for the most part with their good characteristics, e.g., how we can use them to improve the turf and make them perform better for the golfer. Only the most naive among us would believe that there are not some negatives, or at least perceived ones, as well as their virtues. We need to know about them, both to defend their role or, as the case may be, to decide against using one or more of them because of their negative side.

So I want to share with you some information and my perspective about mercury uses. And I want to present it against the general background of concerns that exist about heavy metal fungicides in general, especially cadmium-containing products.

Most of us believe in safety — to you and me, and to our environment. On the golf course, safety includes potential hazard through application, handling, and disposal. It also involves the potential of incidental exposure following application, such as when a golfer treks over treated turf, or licks a ball that has followed a similar route.

Conceivably, it could also occur via food channels. How, you say, can that be when we don't eat products of the golf course, except may be the score card upon occasion? We have to become theoretical and "long range" on this question, but there are those who pose the question about cumulative soil residuals from heavy use of products over a long period of time. What

would happen if the course were converted to a farming or residential area, and ultimately to someone's garden? What might be the consequences? I'm not about to debate the likelihood of this occurring at this point, by the way, but it has happened. (It sure would be bucking the present trend, though, wouldn't it!)

If you are more than 60 years old, you can remember the times when cadmium- and mercury-containing fungicides were all that we had for protecting our courses from dollar spot, brown patch and snow mold. These products came under intense fire during the 60's. The cadmium and chromium products were banned in Wisconsin (though not in most other states), most uses of mercury were banned nationally, while the phenyl and inorganic mercury formulations were retained for very limited uses.

Cadmium as an example. There were several real and alleged raps against cadmium. During the 69's it was found that industrial workers exposed to cadmium were eight times more likely to develop cancer; a Japanese disease called "Itai-itai byo", or "ouch ouch" disease, which produced rheumatism-like symptoms, was linked to cadmium exposure. Cadmium is cumulative in the body, and linked to hypertension, liver, testicular and renal damage. And there is a teratogenic linkage.

It also became evident during that time that cadmium can be taken up and concentrated by plants growing in soils containing high levels of cadmium.

So cadmium came onto the "hit list", though I believe it is proper to say that cadmium is generally not regarded as a problem except to those who smoke (there's an estimated 0.1 to 0.2 ug inhaled with each cigarette) or are subject to it occupationally.

And that is certainly not to say that all the use of cadmium in golf course maintenance work for 50 years ever caused **any** of this. I doubt it, and I've

never heard of any linkage.

But there are at least two additional tests that should be considered: 1) Are there safer alternatives available? and 2) What is going to be the perception with its continued use among both golfers and the general public? In other words, on a risk-benefit use, can it be defended?

I didn't think it could. Cadmium's primary role was for dollar spot control. While it was good, a number of our present day, very effective organic fungicides had appeared on the scene by that time. Also, there were an increasing number of cadmium-resistant cases of dollar spot appearing. I elected a long time ago not to dig in my heels on this one.

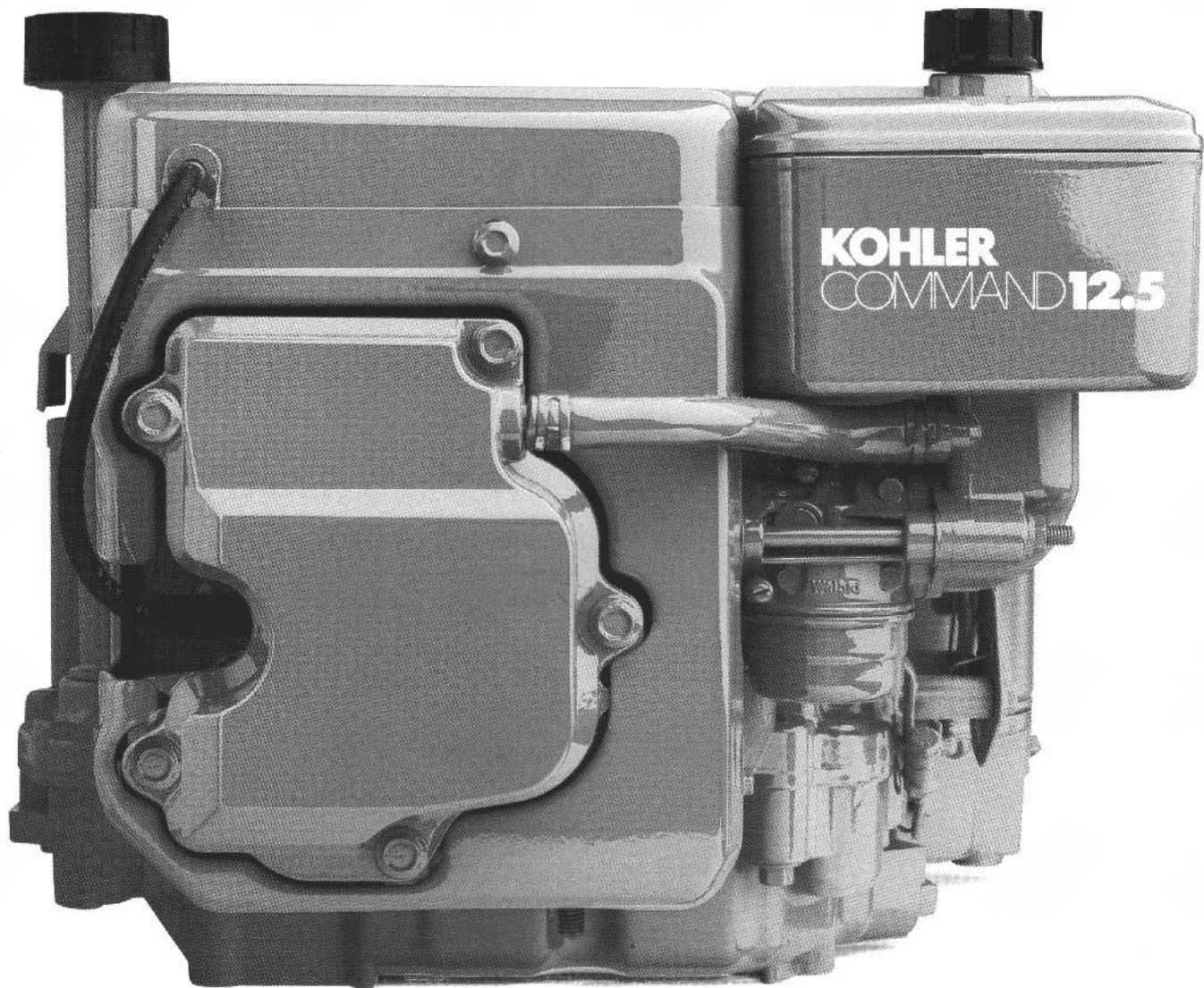
So now to mercuries in the 1990's — what's the connection? Both are heavy metals, both are cumulative in the soils where applied, and both — in certain circumstances — are clearly recognized as hazardous to human health.

But there are some differences.

For the general population, exposure to methylmercury formulations, particularly via fish, is by far the most dangerous form of exposure. Following the disastrous fish episode in Japan, it was learned that various mercury forms can be bioconverted microbially to the highly toxic methylmercury formulation in the bottom sediment of water (lakes and streams). Some people poisonings by careless handling of methylmercury-treated seeds also took place about the same time, and it was clear that these formulations were going to be lost to agriculture and other industries.

But there are other, much less toxic formulations of mercury. That isn't to say that exposure to phenyl and inorganic mercuries we still have around can't be hazardous. They can be absorbed by skin or inhaled. But they have much less toxic effects, and the body eliminates them over time. The literature says 30 to 60 days. So they are

(Continued on page 27)



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(Continued from page 25)

a problem for a careless applicator, perhaps, but proper handling and application techniques should eliminate that hazard.

What about mercury accumulation in the environment, and possible bioconversion to methylmercury?

You should know that those questions were scrutinized in detail when present uses were retained back in 1972. Largely under the direction of the Mallinckrodt Chemical Company, which at that time was the distributor of Calo-Clor and Calo-Gran, and which had the responsibility for collecting the data and defending it, some seven golf courses with a long history (up to 45 years) were examined in detail to find out: 1) where the mercury that had been applied previously now was; 2) whether mercury levels were different above, at or below the streams and lakes adjacent to the courses; and 3) whether any biomethylation of mercury had occurred, either in the turf sites or in the adjacent waters. (More than seven courses were involved in certain parts of this study.)

Examination of the water, sediment and fish from the streams of the nearby golf greens did not show evidence that the mercurials had been transported by any means. The mercurials were found to be strongly bound in the organic thatch and the upper six inch soil profile where they remained in concentrations ranging from 0.01% to 0.04% where use had been most extensive. No methylmercury could be found at the detectable level, either in the turf environment or in adjacent waters.

So, as long as mercury was not introduced directly into the water, there appeared to be no threat in the aquatic environment. I am not aware of any additional information that has come along to contradict that conclusion. And with the concerns today about possible groundwater contamination, these data should serve to dissuade that question.

But the mercuries do accumulate. They are basic elements, they don't leach or move, so that's no surprise. Suppose a garden were somehow to be placed over an old green at some time in the future. Would that constitute a problem? Well, unlike cadmium, mercury is not taken up and accumulated in plants. From my perspective, I don't see that as a likely problem.

Potential exposure to the golfer is another concern. One consideration is when a chemical is applied. The appli-

cation is made after the busy season, and the chemical certainly has an opportunity to dry (or settle in, if applied as a granular) on the turf before the small amount of play remaining would take place.

But cautions remain. One thing that emerged from the Mallinckrodt studies was that clippings from early spring mowings contained mercury. This came as no surprise to anyone, but someone could argue that there remains a limited amount of golfer exposure, which the EPA could conceivably judge to be too great a hazard. I don't know the amount of that exposure. My perspective is that the amount an individual golfer would be exposed to would be measured in levels well below any biological concern, and the mercury form, remember, is not of the biocumulative form. When spring topdressing occur, the remaining chemical is no longer on the surface.

However, one should think about the mercury in the first clippings. Not that anyone would, I hope, but they certainly should not be disposed of in the lake or stream. And when applications are made, care should continue to be made to honor the 25 foot barrier from green to water.

Other precautions during application, as prescribed on the label, should be followed. These include safety clothes and the way chemicals are stored and applied. The fact that inorganic mercuries have an LD₅₀ of 55 mg/kg, that it can be absorbed through the skin and also inhaled are points not to ignore.

One more test remains: Are there biologically and environmentally safer alternatives available today?

For the past twenty years following the initial mercury concern, we have looked at virtually every experimental and registered turf chemical that has come along for snow mold activity. Many of you have been instrumental in helping us to do this. A number of chemicals have quite a bit of activity against the various snow mold fungi. And many of you have put together combinations of, say PCNB, chloroneb, and maybe some Daconil, thiram, or other chemicals that do the job for you. Certainly the pressure is not as great on some courses as for others, and I believe we can expect control on certain courses 90% of the time without mercuries.

We've not had that consistent a success on other courses, however, especially where snow mold seasons are

longer, or where summer fungicide applications have not been as great. For that reason, I'm not willing to concede that we have alternatives for the inorganic mercuries on our greens and tees as a sweeping statement.

We have learned that excessively high rates, for instance, repeated maximum rate applications, do not do any better than lower rates where the mercuries are incorporated with PCNB or chloroneb, depending on site. In fact, combinations including only one or two ounces of mercury are virtually always as effective as higher rates of inorganic mercury, either alone or in combinations. So we've learned how to reduce the amount used.

Of course, if society decides that a lower level of control is acceptable, then we do have alternatives. Our judgment has been based upon the present demand, which is a green coming out of the winter in sound condition without holes that prevent its early spring-time enjoyment.

It will be interesting to see how mercuries are judged by the new generation. I've given you my thoughts. How do you feel about it?

***Update on EBDC's.** On the date of this preparation, December 4, 1989, the EPA announced its proposed cancellation of registration. Maneb and mancozeb uses on homeowner turf and other crops would be eliminated. The news release was not clear to me about mancozeb future on other turfs.

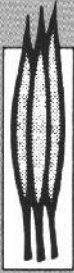
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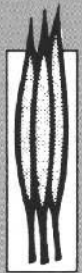
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PLAYERS AND BUILDERS ADD TO NOER CENTER FUNDS

Link Brothers Construction Co., involved in the new Cedar Creek Golf Course near Onalaska, listened closely to WGCSA member Pat Norton's conversation about the value of research and promptly sent money to support the NOER CENTER for TURFGRASS RESEARCH.

The Central Wisconsin Golf Association expressed support from the amateur golfer in that part of the state for turfgrass research by donating \$500 to the O.J. NOER CENTER. It's especially satisfying to see support from an end-user of turf research.

NOER FOUNDATION SUPPORTS NOER CENTER

Jim Spindler also used the occasion of the WTA Golf Outing at West Bend C.C. to contribute to the NOER CENTER. He did so on behalf of the NOER FOUNDATION and presented proceeds from the 1988 Wisconsin Golf Turf Symposium to the Wisconsin Turfgrass Association.

“GIVE CREDIT WHERE CREDIT IS DUE”

And credit is due Don Zimmerman of the Kettle Hills Golf Course for a \$500 donation to the O.J. NOER CENTER for TURFGRASS RESEARCH. Due to a misunderstanding, Don's gift was noted under the Wisconsin Golf Course Superintendents Association. After some explanation to the University of Wisconsin Foundation, that has been corrected and noted in the Honor Roll.

Apologies are extended along with our thanks.

KELLOGG SEED, NATURAL ATHLETIC TURF GIVE

Don Stein went to the WTA Golf Outing with a check in his pocket. During the presentations, he gave a \$2,000 check to the O.J. NOER CENTER for TURFGRASS RESEARCH from Kellogg Seed Inc.

A longtime supporter of the Wisconsin Turfgrass Association, Kellogg Seed, through Don and Egon Herman have contributed mightily to turf research in our state. Once again, thanks.

Roy Zehren, WTA and WGCSA member and *The Grass Roots* advertiser, has joined the NOER CENTER Honor Roll. His support is greatly appreciated.

ONE GOLF COURSE ADDED TO HONOR ROLL; ANOTHER ADDS TO ITS CONTRIBUTION

Mike Drugan, golf course superintendent at Castle Mound Golf Course, was happy to see his course added to the list of donors to the NOER CENTER project.

Mark Kienert's persistence and hard work on behalf of the NOER research facility paid big dividends in late September. He used the WTA Golf Outing to present the UWF a substantial check from the members of his club.

1990 WGCSA Meetings

You Won't Want To Miss This One!

Bruce Worzella and his education committee are starting the new year (and the new decade) with an excellent program for our first meeting in 1990.

The meeting will be held at the Clarion Hotel in Fond du Lac on March 12th. The program is titled "The Environment and Us", and features the following speakers and topics:

National Environmental Update — Bill Roberts

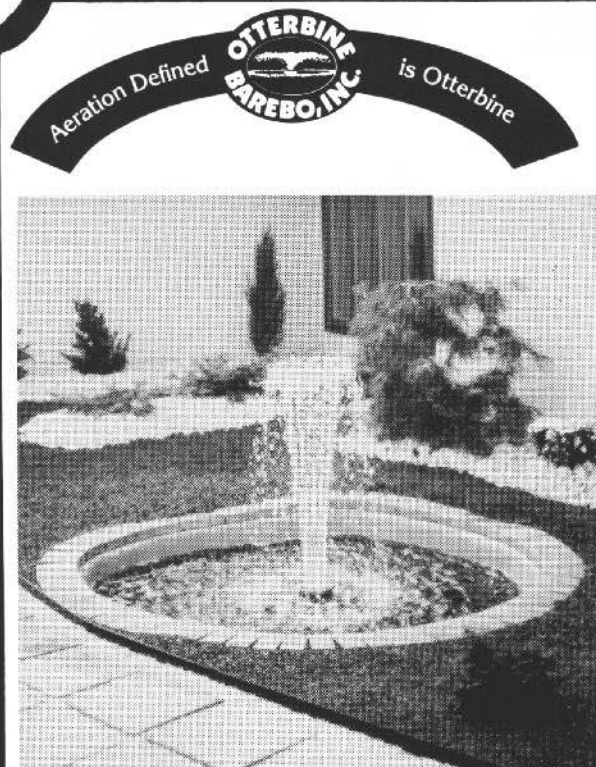
Above Ground Fuel Storage — What I've Done — Tom Harrison

AG 29 — How It Affects Us — Red Roskopf

Chemigation — Why, and What's Involved — Jerry Kershasky.

Don't miss this meeting. These issues will be confronting each and every one of us.

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