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2.

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5.

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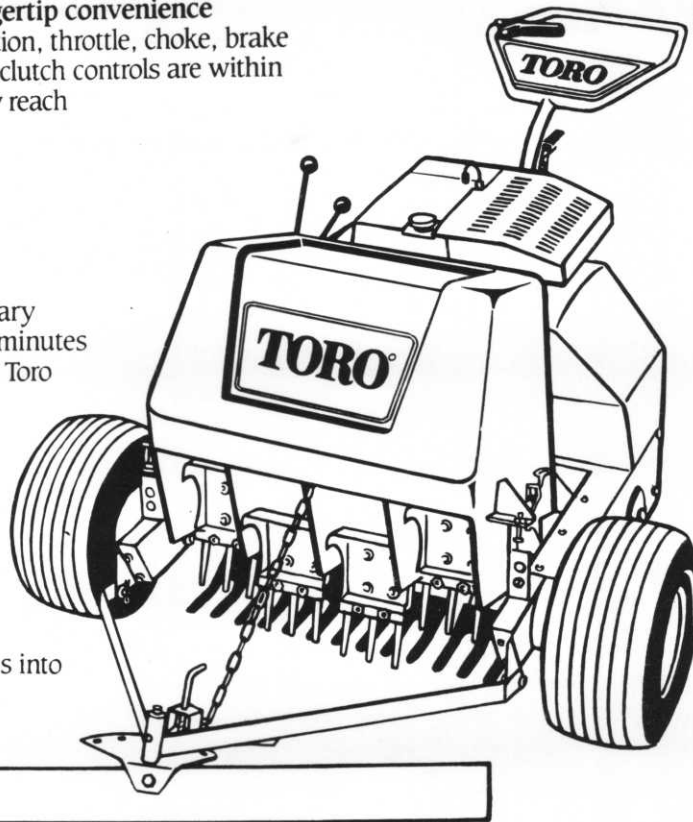
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7.

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**TORO**

# HOLE NOTES

OFFICIAL PUBLICATION OF THE MINNESOTA GOLF COURSE SUPERINTENDENTS' ASSOCIATION

EDITOR: WARREN J. REBHOLZ  
6550 YORK AVENUE SOUTH  
SUITE 402  
EDINA, MINNESOTA 55435-2383  
PHONE: 612/927-4643

ASSOCIATE EDITORS: GUY R. GREEN  
ROSS T. GALARNEAULT

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## FROM THE PRESIDENT'S DESK

SCOTT HOFFMANN, CGCS

I hope by the time this article gets to press we will have had our April showers, but I think the extremely dry spring up to this point is worth commenting on. A typical spring opening challenges our organizational abilities in preparing the golf course, usually with skeleton crews, for our very eager Minnesota golfer. With the very dry spring we are experiencing, our planning and organization that should have taken place last fall and winter really comes to the forefront.

Were our irrigation systems winterized properly and in good working condition last fall and now ready to perform when needed. Is our equipment serviced and ready for operation. Have our chemical and fertilizer orders been submitted. How about hand tools, tee accessories, irrigation inventory, and often used machinery repair items. Do we have a schedule and plan for capital improvements. Is the crew hired and what are their starting and ending dates. Was that new equipment purchase thoroughly researched and will it perform to expectations. Were our operating budgets carefully prepared and did we find time to keep abreast of industry advancements and changes.

These are only a few of the many items we as superintendents must attend to in the off-season, so next time someone asks us what we do all winter we will continue to smile and respond "we keep busy", knowing that the proof will be in the pudding come golf season.

I don't know what kind of magic Dale Wysocki possesses but for the third year in a row he has managed to arrange perfect June weather for our April meeting, and as we have come to expect, Dale and his club were the perfect hosts. Now, if they could just do something about those April golf scores.

We have our 2nd Annual Minnesota Turfgrass Research Benefit Tournament coming up on June 17. This event is sponsored by the MGCSA and is unusual in that it is played on 18 different private clubs and is open to the public. You can learn of all the details in this month's HOLE NOTES.

We return to Stillwater Country Club in May for what should be a sure cure for any lingering effects of "Spring Madness". See you there.

# BUILD YOUR OWN GREENHOUSE

by Anita L. Halvorson  
Oak Ridge Country Club

Now that the 1988 season is starting to get under way, I think it is time to give you one more thought to ponder. I'm sure many of you have been slowly incorporating flower beds somewhere on your course. It might have started with a few flowers around the clubhouse. The patrons liked the color and suggested a bed or two on the course. Next a gardener was hired to care for the beds. Before long your flower budget has almost caught up to your fertilizer budget! Well, maybe not that high. What I am leading up to is the new trend at some of the clubs to build a greenhouse. Why a greenhouse? Well, that's the question I am going to attempt to answer.

I have been at Oak Ridge Country Club as the full-time gardener for the past two years and have been working on golf courses for the past thirteen years. One of the most frustrating problems I have found is dealing with the garden center or nursery about the flower order. Many times when the order comes the colors aren't what you ordered or they didn't send the number ordered. The plants are barely out of the soil or they don't have what you want. Then you have to scramble and make do with what they have sent or fight with them to get the order changed so you can get the beds in by the time the golfing season is over. Therefore, from the gardener's viewpoint, the reasons for a greenhouse are to get plants of a proper size and color and to gain control of what to plant. From the superintendent's viewpoint it can be economical.

There are many types of greenhouses: Glass, fiberglass, single and double poly. Glass is, of course, more breakable and appealing to vandals. Fiberglass retains heat better than glass or poly. Poly is the least permanent and needs to be replaced every two or three years. If built properly, a double poly greenhouse can be heated fairly economically. You have to decide what is going to work best for you. At Oak Ridge we chose a free standing double poly hoop house. Our initial cost for the greenhouse was as follows:

Framework (for 24' long).....	260.00
Poly (double 6 mil).....	106.00
Lumber and insulation.....	300.00
Gravel (floor).....	50.00
Exhaust fan and thermostat.....	75.00
Blower fan for inflating.....	24.50
the two sheets of poly	
Heater.....	Donated

Pipe, etc. for gas and water.....	200.00
Door.....	75.00
Benches.....	200.00
Propagation Mat and thermostat	133.00
Pots, soil and trays.....	500.00
Total Cost.....	\$1,923.50

After your initial set up cost, the following year's expense will be minimal. Soil, fertilizers, chemicals, seed, water, fuel, electricity and every two or three years the new poly (if you chose a poly greenhouse). The results for us have been measurable. From a \$300.00 seed order, you can carefully harvest enough flowers to blanket your course in colorful flowers. I also forced some tulips and daffodils for the clubhouse throughout the winter and spring.

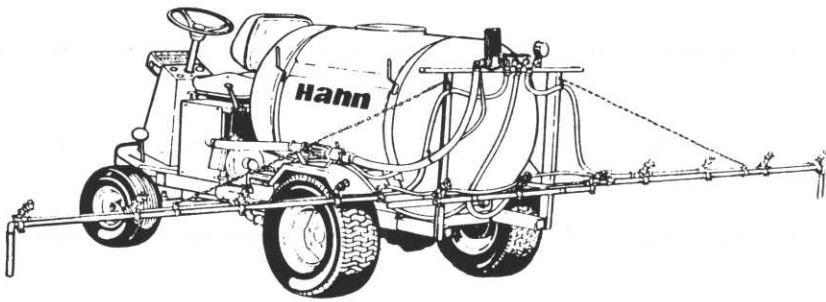
Some of the most important aspects to consider when building your greenhouse are placement on the site, heating and cooling, humidity control and light. Having decided what type of greenhouse you are going to build, you obviously don't want to waste its potential by placing it in the shade of tall trees, buildings or hedges. It is worth remembering that, because the sun is lower in the sky in the winter than in summer, the shadows it casts are longer. Make allowance for this if you are planning where to put your greenhouse in the summer. Any shadows will be at least four times longer in winter and that is when you need the most sun. On the other hand, buildings, hedges and trees can be useful shelter from cold winter winds that could cool the greenhouse and add to fuel bills.

While heat is important in the greenhouse in winter it is worth remembering that a greenhouse is such an efficient sun energy trap that it can overheat in spring and summer. Probably more plants are lost through over-heating than through under-heating in winter. When considering automation for the greenhouse, ventilation and cooling controls, a convenient water supply is also essential since few things are more annoying than running around with watering cans. Your costs will vary depending on availability of materials and the extent to which you want to equip your greenhouse.

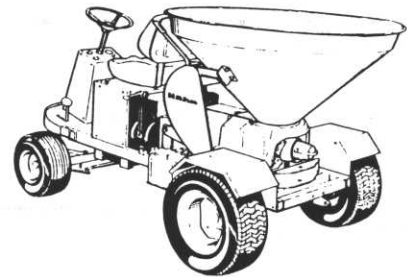
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# Just How Toxic Are The Chemicals We Are Using On Our Courses

By Paul Sartoretto, Ph.D.  
W.A. Cleary Chemical Corporation

For the past fifty years I have been going around the country speaking at a regional or monthly meetings of the Golf Course Superintendents on the subject of tank mixing pesticides with the emphasis on compatibility and avoiding phytotoxicity. There is a relationship between human toxicity and phytotoxicity as you will see, primarily because of the close similarity of the toughness of the epidermis of the grass blade and our outer skin. The skin of the grass blade has its stomates through which air and water pass in and out. Whereas our skin has pores through which water diffuses.

In my talk I make a general broad statement that all the insoluble pesticides can be tank mixed and sprayed and you will not incur phytotoxicity. The reason is obvious. Even though the insolubles have to be ground down to micron size in order to get

them to disperse in water, the micron particles are too large to diffuse through the stomates. They have to be thousands of times smaller, actually molecular in size and in solution to diffuse into the cells of the grass blade.

The same principle applies to our outer skin. The insolubles cannot be absorbed through our pores because the particles are too large, and only the solubles that are molecular in size can diffuse through the skin.

You can take a certain amount of comfort in knowing that you work with a large number of insolubles and that they cannot penetrate our tough outer layer of skin, and can conclude that epidermal toxicity with insolubles (wetable powders and flowables) is non-existent to a very high degree.

From what you have learned thus far you can see how doubtful the claim was that a golfer died as the result of dermal exposure to Daconil 2787 which is an insoluble and was sprayed on the grass. No way could Daconil have diffused into his body. It could be argued that Daconil vaporized and that he breathed in a sufficient amount of it to poison him. I will now show you how doubtful this mode of toxicity is with respect to Daconil.

Whereas the grass plant breathes through

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stomates and receives nutrition not only through the stomates but also through the roots, we humans breathe through our lungs and receive nutrition through our mouth, and then via the alimentary canal, by digestion into the blood stream. We measure toxicity primarily by the minimum lethal dosage necessary to kill an animal by ingestion. Let us use aspirin as a bench mark to compare with our pesticides. It takes 1750 milligrams of aspirin for every kilogram of body weight to kill 50% of the animals ingesting it. The MLD50 of aspirin is 1750—that's about 6 aspirin tablets. An adult weighing 50 kg. (110 lbs.) by extrapolation would die from 50 times the dosage or 300 aspirin tablets. In actuality, 10 times the dosage or 60 aspirin is fatal - 17.5 grams about 2/3 of an ounce. Reference is Merck Index.

But Daconil 2787 has an LD50 of 10,000 mg. That is six times safer than aspirin. That golfer would have had to ingest 100 grams or over 3 ounces of Daconil to have killed them. That's unlikely.

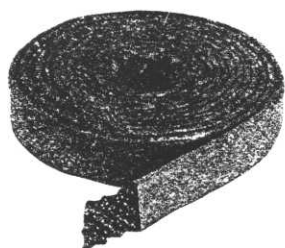
In my speech on how to avoid phytotoxicity, I generalize by saying insolubles cannot burn, but solubles can and you must exercise caution in their use. We have been comparing an insoluble Daconil with a soluble aspirin. Aspirin is a safe soluble, but there are a number of solubles that you use that are

not as safe as aspirin but keep in mind the LD50 of aspirin as a bench mark.

You may have read recently about a fanatic that has been killing a lot of household pets in North Carolina by lacing pet food with the pesticide DISYSTON, and insecticide you don't use, but farmers do. The LD50 of DISYSTON is about 3 mg. per kg. A cat or dog doesn't weigh much more than 3 or 5 kg., so a lethal dose is not much more than 30mg. which is the equivalent of a couple pinches of salt. DISYSTON is a thiophosphate insecticide not much different than the thiophosphate insecticides that you are using, except yours are safer. Oktanol is 10 times safer with an LD50 of 32; Dursban is about 50 times safer with LD50135; and Diazinon is 100 times safer with LD50300. Nevertheless, these are low LD50's and the concentrates are potentially dangerous. They act on the insects and humans in the same way by poisoning the nervous system.

Ironically, Granular Diazinon which is the safest of the three has been suspect for use on golf courses in some areas because of unfortunate misuse. They are usually formulated as emulsifiable concentrates dissolved in a organic solvent with an emulsifiable agent added. These in turn are to be mixed with large

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volumes of water, sprayed on the golf course with a further recommendation that they be watered in to get to the grubs. The same emulsifiable concentrate can be mixed with a granular carrier such as corn cobs or vermiculite so that they can be applied with a spreader with further recommendation that they later be washed into the soil with large volumes of water. If the corn cob is laced with Diazinon it becomes a tempting poisonous morsel for a bird. Birds weigh less than a kilogram, so all they have to ingest is about the amount of Diazinon that is equivalent to the amount of a baby aspirin.

Unlike the insolubles, the solubles can be absorbed through the skin. As a rule one need not worry about the diluted spray, but has to exercise caution in handling the concentrates. Wear protective clothing and a respirator when preparing the diluted mixture in the spray tank.

Let's consider a prominent soluble fungicide which has been around for many years and has a startling high toxicity. Yet you have used it successfully for a couple of decades without any fear that it could have been hazardous. This product is Actidione TGF - an antibiotic! Antibiotics are safe; haven't we all taken antibiotics prescribed by doctors? Well, this one has a LD50 of 2 mg. per kg.! But, Upjon, the manufacturer, did an excellent job of

formulating the product so that you received it in a form that was non-poisonous. A product must bear a skull and crossbones label if the formulated material has an LD 50-50. By diluting Actidione with inerts so that you received a 2% mixture the formulated product then had an LD50 100. You, in turn, were asked to dilute the product with water at the rate of 1 oz. per 3 gallons of water. The diluted spray then had a LD50 37,500.

This example emphasizes the importance of exercising great care and caution with the formulated concentrate and at the same time demonstrates the minimal danger of handling the diluted spray. Actidione was taken off the market because EPA challenged the risk factor and Nor-Am made the business decision to drop the product.

Following is a table providing you with LD50's of all the pesticides available to the Golf Course Superintendent. This data was taken from W.T. Thomson's Agricultural Chemicals 1985-86 Revision. Bear in mind that the LD50 refers to the pure active ingredient so that if you want the LD50 of the formulated product you divide by the percentage of active. For example, Caddy is 20% Cadmium Chloride solution. Since Cadmium Chloride has an LD50 88, dividing by 0.2 the LD50 of Caddy becomes 440.



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ICI \* Gro Safe, Fusilade  
Mobay \* Oftanol, Bayleton, Dyrene  
Noram-Tuco \* Nitroform, Banol  
Rohm-Haas \* Fore, Dithane  
Solo \* Backpacks, Handheld Sprayers

Brandt \* Turf Mix Micro Package  
Ciba-Geigy \* Subdue, Diazinon, Banner  
Dow \* Turflon, Dursban  
Elanco \* Balan, Surflan, Rubigan  
Hoechst \* Acclaim  
Sierra \* Vorlan, Duosan, Calo-Clor  
Monsanto \* Roundup  
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Nothing in my talk should be interpreted as a suggestion that you can ignore safety in using pesticides. Read and follow the label instructions carefully! Read the Material Safety Data Sheet carefully! Follow the manufacturer's recommendations on personal protective equipment required. It is better to be overly safe than sorry.

**Toxicity of Pesticides**

Expressed as Minimal Lethal Dosage necessary to kill 50% of the test animals by ingestion expressed in milligrams per kilogram body weight **MLD50** mg/kg.

**INSECTICIDES**

DASANIT .....	4
NEMACUR .....	15
OFTANOL .....	32
MOCAP .....	62
DURSBAN .....	135
DIAZINON .....	300
PROXOL .....	450
SEVIN .....	500
METHOXYCHLOR .....	6000

**HERBICIDES**

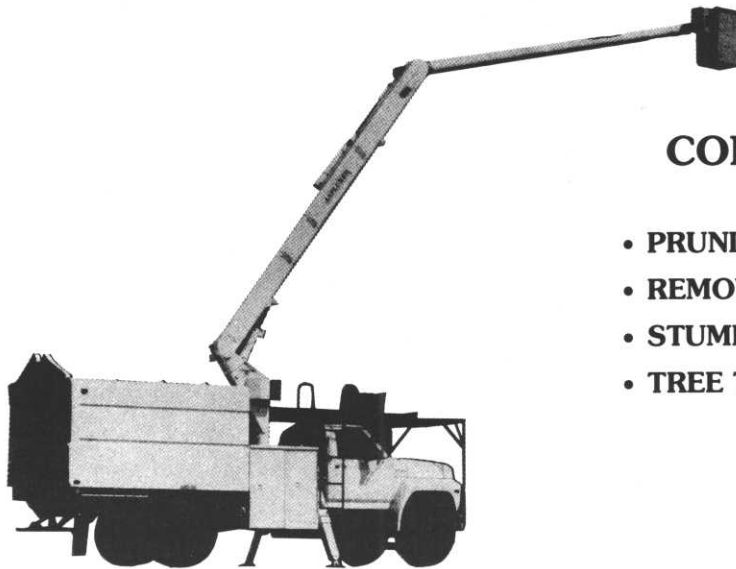
PARAQUAT .....	150
2,4DP .....	300
2,4D .....	375
DSMA .....	600

MSMA .....	700
BETASAN .....	770
MCPP .....	930
DICAMBA .....	1040
PENDIMETHALIN .....	1250
DACTHAL .....	3000
BALAN .....	10,000

**FUNGICIDES**

ACTIDIONE .....	2
PMAS .....	40
CADDY .....	88
BAYLETON .....	363
CADMINATE .....	660
THIRAM .....	780
BANNER .....	1517
KOBAN .....	2000
RUGIGAN .....	2500
CHIPCO 26019 .....	3500
DYRENE .....	5000
ALLIETTE .....	5800
FORE .....	7500
FUNGO .....	7500
BANOL .....	7860
DACONIL 2787 .....	10,000
TERSAN 1991 .....	10,000
PCNB .....	15,000
3336 .....	15,000

*Credit: A Patch of Green, Michigan Border Cities GCSA, May/June 1987*



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## EDITOR'S CORNER

BRAD KLEIN, CGCS

Spring really has sprung at my house with a new little golf course superintendent joining the ranks. My wife and I have decided not to spoil this child, that's not to say we'll hold back any love and affection. What we're going to attempt is a balance between discipline and guidance.

There are many things that correlate between children and golf courses and in most instances, the same approach to solutions will yield similar results.

With a child it is sometimes amazing what candy or a new toy will do to calm their screaming and whining, if only for a short time and then right back to the same old tricks. Golf courses, both the land and the players on it, do this same whining and screaming and demand their favors to keep quiet. The treats we give them are excessive fertilizer and over watered greens. The golf course is real green and the players can now keep their solid Top Flite

golf balls on the surface but, like a child, the treats are fattening and fat cells are not what any child wants to live a long, healthy life.

The discipline involved here is to remember that the golf course is a living thing and it must be fed both water and fertilizer to grow and prosper. A fellow superintendent challenged all of us at our annual conference last December to cut back on fertilizer and water and see what a lean mean fighting machine our course can be. The golf course, like the child, needs its rewards but only in a responsible manner.

The guidance we can give is the education of our players and children alike. Somehow we must inform them that excesses, whether it be water and fertilizer or candy, is not really a very good solution to the long term goal of growing good turf or children.

We must educate ourselves as well as our players as to what makes a good playing surface and a healthy one without the excesses of fertilizer and water. The old saying of "spare the rod, spoil the child" has some meaning in turf management also, not to say we whip either our golf course, players or children but rather guide them along a healthy path in life.

May 9 we'll all get together again at Stillwater Country Club and if the weather and playing condition mimic the

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Cushman's cooling system keeps the engine running smoothly without excessive heat build up for a longer, more productive life. A water jacket surrounding the combustion chamber not only keeps the engine cool, it also keeps the engine quiet. The cast iron engine block absorbs even more vibration and noise than competitive aluminum blocks.

The result is more power, less noise, less vibration, less wear-and-tear. Available in three- or four-wheel models, this new Front Line Mower gives you the same clean cut you've come to expect from Cushman.

Whether it's the new gasoline, water-cooled Teledyne-Wisconsin engine, the 21.5 hp diesel-powered Kubota engine, or OMC's 22 hp, air-cooled gasoline engine, there are plenty of powerfully good reasons to mow with Cushman.



Jerry Commers

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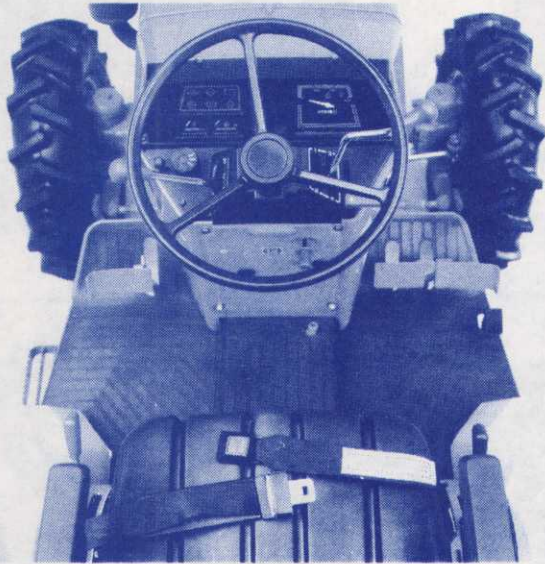
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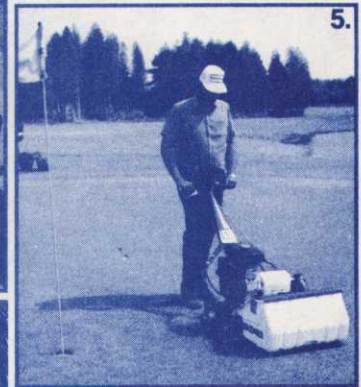
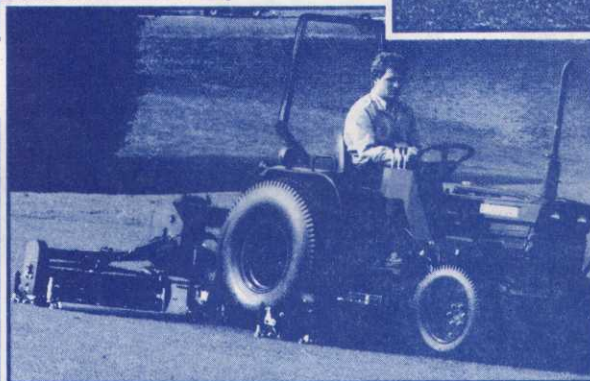
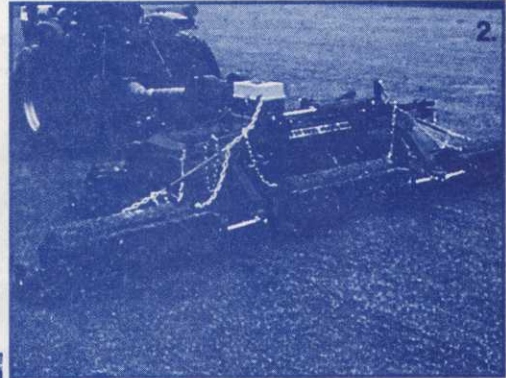
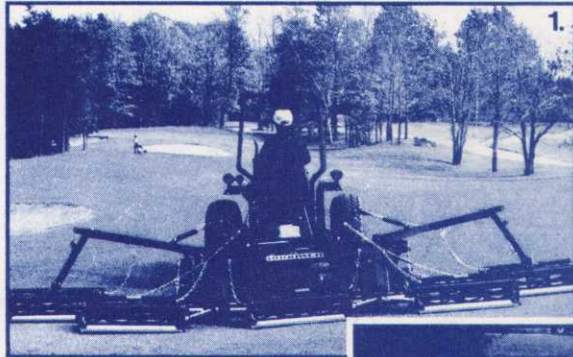
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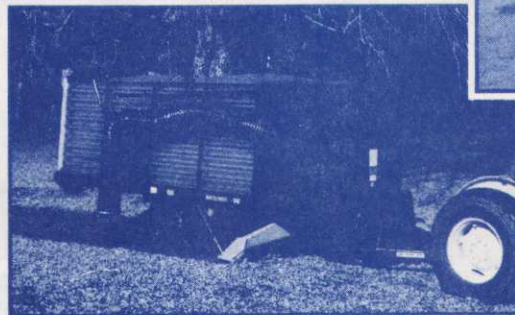
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2. 5-Gang Verti-Cut
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4. Triplex-376 Mower
5. Greensmower
6. Brouwer-Vac



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- Reliability
- Service

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April meeting at Faribault Country Club hosted by Dale Wysocki, we'll have another wonderful time.

The superintendents that have held meetings in the past should all receive a pat on the back for submitting their courses to so many critical eyes. Those that would like to host meetings in the future can use the opportunity to collect many suggestions and ideas for future reference.



"I told you this was a tough hole."

## THE BEST MEMORY SYSTEM

Forget each kindness that you do  
 As soon as you have done it;  
 Forget the praise that falls to you  
 The moment that you have won it;  
 Forget the slander that you hear  
 Before you can repeat it;  
 Forget each slight, each spite, each sneer,  
 Wherever you may meet it.

Remember every kindness done  
 To you whate'er its measure;  
 Remember praise by others won  
 And pass it on with pleasure;  
 Remember every promise made  
 And keep it to the letter;  
 Remember those who lend you aid  
 And be a grateful debtor.

Remember all the happiness  
 That come your way in living;  
 Forget each worry and distress,  
 Be hopeful and forgiving;  
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