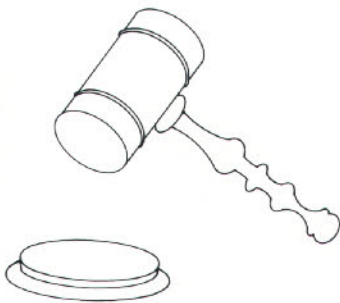


President's Message



By Bill Roberts

I have a file in my desk at the office labelled "Groundwater". I started this file about five years ago when, with increasing regularity, I would read accounts in our local newspaper about a growing concern relative to nitrate concentrations in groundwater in the Central Sands of Wisconsin. This concern gradually, and then quite suddenly, developed into an anxiety over the concentration of aldicarb in that same groundwater.

I've used this same file as a focal point for newspaper clippings dealing with the "Agent Orange-2,4,5-T" debate including the current "off-shoot" that has brought intense scrutiny to 2,4-D, an effective, proven and, now, questionable product. The file has continued to grow thicker with industry news and media examination of Daconil and Diazinon. We've seen Cadmium threatened and we've seen Acti-Dione vanish in recent months. Thiram may or may not require a "re-entry" qualification and speaking of "re-entry", I had to start a second file in order to keep abreast of the controversy in Wauconda, Illinois and the battle over "posting" and "pre-application notification". Even Wisconsin's own Milorganite has been subjected to a careful examination in the media and, in the long view, may become an even better product because of it.

Now we, as Golf Course Superintendents, have met our part of this challenge. We have, time and time again, produced aesthetically pleasing playing conditions on golf courses used by some 15 million players each year and we have done it with a sense of environmental responsibility personified by continuing education and skilled decision-making balanced in terms of cost-benefit.

We have fulfilled our roles as disciplined environmentalists by developing new, safer application techniques in the field and transferring a wealth of accumulated knowledge into Integrated Pest Management programs which have impacted the entire turfgrass industry. We have trained our staffs. We have designed and installed safe storage, loading and disposal structures and have made the golfing public aware of the intricacies of golf course management because we believe it is in everyone's best interest to communicate such information.

We have accepted the scrutiny of the scientific community and cooperated with various regulatory agencies as new knowledge regarding these materials has come to light. When products, by a process of valid scientific research, have been found to be unsafe, we have insisted that safe products be developed as alternatives and we have abandoned the harmful for the responsible. We respect precise, developed, insightful discovery and we utilize such a discipline to everyone's benefit.

But then...we run into someone named Bob Condor, who has written something called "Killer Courses" for something else called "GOLF" magazine. Mr. Condor, whose credentials in either, or both, the scientific community and/or the golf turf industry, have yet to be established, uses space in a national golf magazine to offer such precise observations as "Daconil 2787, a common fungicide sprayed weekly at the Army-Navy course to control brown spots on greens". Brown spots? Brown spots on greens? I have yet to meet a Golf Course Superintendent who programs his pesticide program to control "brown spots".

Further, Mr. Condor cites an exam-

ple that includes "a chemical similar to Daconil" that "allegedly killed a Florida family after it was used to fumigate their house". Not only has the specific cause escaped Mr. Condor thereby negating any potential benefit in terms of preventing such a tragedy in the future but he has also, somehow, made the dubious correlation between a "closed environment" such as a house and an open golf course and between a "chemical similar to Daconil" and Daconil.

Mr. Condor goes on to quote a certain Dr. Samuel Epstein, environmental toxicologist at the University of Illinois Medical Center. According to Dr. Epstein, "a golf course is essentially a hazardous site, and it's time golfers realize they are captive to an industry that is indifferent and ignorant about public health."

Excuse me...Pardon me...Just a damn minute, Mr. Condor and Dr. Epstein, but, how dare you accuse me and my fellow professionals of such "indifference and ignorance"? I have enumerated the on-going measures, the training that we, as Golf Course Superintendents, pursue. Formal education as background does not imply ignorance. Years of practical experience will not allow for indifference. Mr. Condor, your premise is insulting. The Golf Course Superintendent has a deep respect for the land he is entrusted with and a genuine affection for the people who use it. Those two feelings do not allow for "ignorance and indifference".

"Writers" and "toxicologists" who make unsubstantiated charges, whether directly or by implication, are guilty of so much more. By choosing the unscientific, the undisciplined, the exaggerated route, one becomes associated with irresponsibility and disservice and that choice is the one made by the author of the article in question.

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The "DISSERVICE TO GOLF" Award

By Monroe S. Miller

Ask almost any Golf Course Superintendent to nominate a candidate for an award that recognizes unfair, unjustified, uninformed and unconscionable harm to America's golf courses and you'll find a hands down winner for last year. He's one Bob Condor, author of the article "Killer Courses" that appeared in the December 1986 issue of Golf magazine.

I don't know what Mr. Condor's credentials are, but I do know for certain that he is no environmentalist nor is he a very good investigative reporter. And it is for certain that he is no friend to our country's golf courses. If you cannot register as a friend to golf courses, you can't proclaim or even pretend that your interest is that of golf. My guess is that the man probably doesn't care one way or the other. What I do conclude, after reading his article a dozen times for even a shred of evidence that might support his frightening title, is that his bottom line is selling magazines.

The article is presented as a "Special Report". In fact, it is anything but special and reports absolutely nothing. It is the employment of subterfuge to disguise an editorial by a person who obviously is ignorant about how pesticides are used on golf courses and how absolutely essential they are to the production of golf turf for the players of America. Further, I believe it is maligning to the professional Golf Course Superintendents of the country. I resent that more than I'll be able to convey in these few paragraphs. Rather than turning the other cheek, we all must clench our fists for a fight to defend our right to continue the safe use of agricultural pesticides on the golf courses that are so important to our country's environment. Golf is counting on us.

Mr. Condor's article is a classic in the study of how environmental extremists operate. Their most obvious tact is to generate fear and horror. It is easy to generate this emotion, but extremely difficult to dispel. Responses like this

one I am writing are merely drops in the bucket of defense that will be required to right the harm done by Condor to golf courses. He refers to "headaches and nausea", skin that is "festered and swollen", and warns of "memory loss, fatigue, nausea and dizziness". He tells of failing internal organs and heart attack, and amplifies that fear with the tale of a \$20 million lawsuit. Such things scare me as much as anyone else. Fear works for journals - it makes news because fear is interesting to read. And if you doubt his intention of peddling fear, take one look at the graphic in the middle of the first page of the story - a bottle fronted with a skull and crossbones placed over a serene picture of a golf player. If his story didn't scare you, the graphic alone most certainly would.

Another characteristic of this and similar articles is that they make use of bad news. Condor's whole story is bad news and takes advantage of the fact that bad news is big news and sells at the newsstand. Nevermind the good that pesticides do - good news is either boring or not even news at all.

To better understand the environmental extremist writers, I've extensively read articles and books by them. There are several other features of almost all of them that Condor used in his article. As a rule, they are composed by journalists with some experience in constructing stories. They are able to fashion these passionate and emotional pieces without evidence to support their premise. I'd like to ask Mr. Condor, "Sir, where is your data?" There are no statistics of any kind presented in his discourse - no blood test results, no figures stating how many players actually have experienced confirmed illness from pesticide exposure and no impartial data generated by investigators that might support his claims. I'm sorry, but one player's use of vitamin and mineral supplements to "stay stronger on sprayed courses" is not valid research support! Condor is a typical "generalist" who

does not deal with any specifics that are essential in building and substantiating a legitimate case for his point of view. The reason, quite simply, is because such evidence just doesn't exist.

Writers of this ilk tend to quote, re-quote and quote again and again the same old worn out opinions of a distinctively small number in the scientific community who have similar views. In Condor's case, it is one Sam Epstein. Of all the environmental extremists I've seen quoted, Epstein's name crops up most often, usually as a quote for the 17th time from some other non-technical piece. Epstein's the one who arrogantly claims that "a golf course is essentially a hazardous site and it's time golfers realize they are captive to an industry that is indifferent and ignorant about public health." This whole situation where the fraternity of extremists quotes one another all of the time was brought home recently as I read the briefs of one of Wisconsin's Public Intervenor's. These are briefs submitted by that office and by attorneys representing the Wisconsin Forestry/Rights-Of-Way/Turf Coalition to the Circuit Court in Washburn County. The Public Intervenor's analysis of the case was irrelevant and inappropriate for several reasons, but one in particular stands out. He submitted no affidavits, no certified copies of regulations in question and no references which were subject to prior court judgement. Instead, he sent forward excerpts from and references to government reports, some of which he had written! That is even worse than we normally experience; such ploys are so outrageous that they are nearly comical.

The negative impact of Condor's article is already hemorrhaging. A biased little newspaper from the backwoods of Michigan has picked it up and featured it twice - once as a "news" story and once as an editorial. Despite the fact that this is an irrelevant, and disgusting article, it demonstrates clearly what happens when this kind of journalism gets loose. Nothing but harm can come to golf, Mr. Condor.

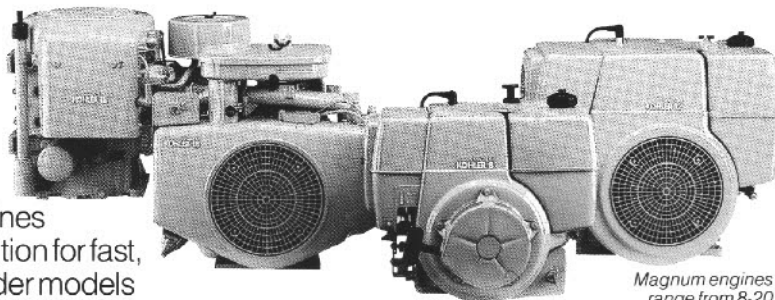
Nowhere in Condor's article does he consider the advantages and benefits of pesticide use on a golf course. A lit-



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tle investigation on his part would reveal that golf as it is played in America today would be impossible without them. Neither does he give even a word of credit to those of us managing golf courses for our outstanding and responsible record in the use of pesticides. He gives no attention to what impact his writing might have on golf (and golf players) should those paragraphs lead even one golf course to try to provide playing conditions without pesticides. The economic impact of such an experiment would be substantial - golf requires reasonable turf conditions and without them golfers will not pay the green fees or membership dues required to maintain a golf course.

I have been unable to determine what Mr. Condor's purpose is, beyond that of selling more magazines. Careful

reading and deliberate thought have not yielded an answer. His title is a rhetorical excess. His article is not analytical and plays on the emotions of his readers. He exaggerates a couple of isolated incidents that lead to flawed conclusions. And most importantly of all, he makes no reference to the risk/benefit equation that must be solved for everything we do in our society; the risk to golfers from driving a car to the course, from smoking while playing and from using table salt in the 19th hole are greater - much greater - than the risk posed them by agricultural chemicals used on their courses. No one, probably including Mr. Condor, would propose closing swimming pools at golf clubs that have them, yet my guess is that swimming pools represent more risk than do pesticides used at those clubs. If the

incidents presented by Condor are taken at face value, they demonstrate very clearly to me that Golf Course Superintendents are doing a *good* job in the responsible use of pesticides on golf courses. None indicate any failures in the use of these materials in the way and for the purposes they were intended and approved.

Mr. Condor's article, in my view, has no significant or demonstrable bearing on the issue of pesticide safety. It has proven nothing, given us nothing new and accomplished little more than creating unfounded fear among our golfing public. I think that makes it irresponsible journalism. His qualifications for a "Disservice To Golf" award stand alone and are not likely to be challenged. I wonder if he will step forward to accept?

If I were him, I'd be too ashamed.

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THE BLAC

By Jerry Kershasky

This past January, at our National Golf Course Superintendents Association Conference and Show, there was a special forum on the so-called "Black Layer" that has been seen on many courses across the country.

The forum opened with a panel of four men reviewing their research on the subject. The panel consisted of: Mr. Jonathon Scott, Golf Course Superintendent at the Grand Traverse Resort in Michigan, Dr. Clinton Hodges of Iowa State University, Dr. Curt Brown of Texas A&M University, and Dr. Joe Vargas of Michigan State University.

Mr. Scott opened the discussion describing his course which was built in 1983 with U.S.G.A. spec. greens. In 1986 three of Mr. Scott's greens, which were in a heavily wooded and low area on the course, turned brown in sections and died. He sent off the usual samples to the local university extension service for disease, nematode, and insect analysis, but all returned negative. He had noticed when he took the samples that a once healthy 10" root system was now all but nonexistent, and that a foul odor was being emitted from a black layer in the greens mix about one inch from the surface.

Mr. Scott also noticed, after an unusually wet summer, that these greens, which had excellent percolation rates the first two years, had difficulty absorbing 1/10" of rain now.

At this point Mr. Scott was well into investigating the problem. Because of the poor drainage he thought he might have a plugged drain tile, so he flushed all lines and found all of them to be in perfect operating condition.

His next thought was that possibly the water table around these greens might have risen, causing water to back up in the tiles at times. He brought in an auger and drilled holes around the perimeter of these greens, but found nothing abnormal.

He did note, however, that after a rain if he stuck a soil probe into a puddle on the green and pushed it through the black layer and then extracted it, the puddle would drain just as if you pulled the plug on a bath tub. This example led him to believe his greens were properly constructed beneath the layer and indeed his drain tile was functioning and the water table was having no

effect on drainage.

He proceeded on to check the shade factor on these greens, but after day long surveys he found direct sunlight was quite adequate.

During this period he had also lost a couple of approaches to the same problem. This led him to believe it might be contaminated soil, so he dug out the approaches and placed new soil in, but this did not help; the turf died anyway.

He went on further, thinking that stagnant air around these greens might be causing the problem. He started thinning out trees and cutting out brush undergrowth around these greens. He is still in this process, so he will not know the results until next season.

A couple of other interesting facts must be mentioned here. One is that he resodded areas on these greens with turf from his nursery, and so far it appears healthy without any problems. Let's note here that the variety of grass was the same on the infected greens and the nursery, but the fertility practice was somewhat different, and I'll refer back to this difference after I review with you the other panel members' thoughts and theories.

The other facts of note were that in high traffic areas the problem was worse, and that frequent topdressing also aggravated the problem, but frequent aerification (as much as once per week) improved the turf.

Dr. Hodges first noticed the problem in 1978, and on all samples he has received, be they from any part of the country, he has been able to identify one of three algae organisms in all samples.

On most of the greens he has observed layers forming on the surface or anywhere from 1/4" to 7" down in the mix profile. He has also noticed these algae forming balls or circular shapes in the profile.

The algae causes both a physical and chemical problem. The physical problem occurs because of the way they move - that's right, these algae are mobile. They excrete mucous which propels them across the surface and allows them to cover a whole green laterally. The algae organism itself is not good, but the deposited mucous it leaves behind might be a good substi-

tute for super glue or any other type of sealant. This mucous adheres so tightly together that water or any other element you would like to have penetrate the surface has one hell of a time doing it. Fungicides applied at this point may stop the progress of the algae but it won't remove that sticky mucous; that has to be physically removed before proper water movement can be restored.

Once this barrier of algae and its mucous has been formed, what happens next is really a matter of chance. For example, the green might receive several days of rain which will cause a perched water table above this layer. The water will fill the pore spaces pushing out oxygen; the algae, of course, are using oxygen in their life cycle and very soon you will have set up an anaerobic condition that the roots of grass plants can't survive. And per chance they do hang on Dr. Hodges has isolated a pythium organism that has adapted to this anaerobic condition so the roots that are now in a weakened state could fall victim to this pythium.

Another interesting experiment Dr. Hodges ran was placing a calcareous sand in one beaker and a silica sand in another, and inoculating the sands with the algae organisms. In a few short days the calcareous sand had algae growing profusely in it and the silica sand had little, if any, algae in it.

Dr. Brown conducts soil physical analysis for greens mixes and other types of construction mixes. He first saw the problem in the early 1980s' when samples that were approved for greens construction from his lab came back to him with a black layer problem. He retested the samples and the physical components were still ok. He concludes that the water movement problem in these greens is not a soil mix problem, but an organic problem. He believes the organics are producing sulfur, (hydrogen sulfide) and that indeed, if left unchecked for years (that's a lot of years), this would end up forming pyrite.

Dr. Brown suggests the following practices to minimize your chances of developing the problem:

1. When constructing a green, make sure your base has no low areas that will form pockets of water that will not

BLACK LAYER

drain toward tiles.

2. Make sure your top mix is a consistent depth. If you have 10" in one area of the green and 6" in another, the 6" area is going to be wet.

3. Surface drainage must be positive, no pockets. Pocketed areas on greens have had the worst problem with this disorder.

4. Excess thatch may be a key in causing the problem, and buried thatch contributes to the problem.

5. Avoid over-watering.

6. Avoid over-fertilizing.

7. Minimize the use of pesticides.

If you have a problem, how do you deal with it? According to Dr. Brown:

1. Aerate, remove and destroy the cores. Don't topdress or build something with these cores.

2. Fill holes with sand.

3. Inject air into greens by installing perforated pipe every 6" and forcing compressed air into the soil profile. (rather expensive).

4. Ph should be 7.

5. Minimize irrigation.

6. Minimize nitrogen fertilizer.

7. Remove thatch.

8. Decrease topdressing; it will bury the problem, making it worse.

9. Pray it doesn't rain; you want control of the watering.

10. Remove turf and resod.

Dr. Vargas first saw the problem six years ago. He doesn't think its caused by algae, pythium, excess water, high ph, or high amounts of N, but rather by an accumulation of sulfides in the soil.

Dr. Vargas went on to explain the chemical conversion of sulfur and iron sulfate to hydrogen sulfide which this stenographer was unable to record in the time the slide was on the screen. But in essence, what was occurring was the excess hydrogen sulfide was a contributing factor in producing an anaerobic condition in the soil. And as we all know, metal sulfides turn black, thus the color of the black layer. In all of Dr. Vargas's samples of the problem, he found excess amounts of sulfur and iron on the black layer greens, and less of these elements on healthy greens he sampled from the same course.

Dr. Vargas was also able to induce a black layer in a week's time by applying five pounds of elemental sulfur and some iron sulfate to a sand in the

lab. The check had no black layer, although all conditions except the sulfur and iron were the same.

Now let's get back to the difference in fertility practices of Mr. Scott. Remember, his nursery did not have the problem but a few of his playing greens did. When he sodded some of the bad areas of these greens with the nursery turf, the nursery turf survived, and root depth increased under it. The difference in Mr. Scott's fertilizer program was sulfur. He was applying sulfur to reduce his high ph on the greens, but as we all do at times, he did not make nearly as many applications to his nursery.

Now my friends, all this which I have just written is new research, and none of these men have come out with, at this early stage of study, a concrete, no doubt about it, this is the problem, and this is what you need to do to solve it, for sure. All these men say they need more time to study the variables and test various theories before they can be conclusive. But as you and I know as turf managers, we have to take what data is available at this time, evaluate it, and if we so deem necessary, work the variables into our program, if for no other reason than to buy time for our researchers to find answers, before we have major problems on our turf.

By the way, when the audience at this panel discussion was asked if they had seen a black layer on their course, three fourths of them raised their hands. The audience was a cross section of turf managers from the east coast to the west coast and numbered about 400.

The following question and answer was taken word for word directly from the back page of the U.S.G.A. Greens Section Record, January/February 1987.

THE BLACK LAYER

Question: This past summer I heard a lot of talk about what some say is a new putting green disease called "the black layer". It usually appears in the soils of greens, even USGA spec greens, usually about two or three inches below the surface, has a swampy odor, and the grass roots and plants die. What do you know about it? (Indiana)

Answer: Enough to say it's not a disease and is not even associated with

a disease. At least no causative pathogen had ever been identified. The so-called "Black Layer" has been around a long time. (See USGA Green Section Record, July 1970, "Solving Drainage Problems at El Macero", by Dr. D.W. Henderson, Dr. D.T. Bradley, University of California, Davis,, and J. Jagur, Superintendent, El Macero C.C.)

It is, pure and simple, an irrigation problem or a drainage problem or both, depending upon how one wants to look at it. The soils become too wet for too long. The swampy odor attests to that fact. Dry out the soil profile, and the Black Layer (and odor) disappear.

Even sandy soils and USGA spec greens can become too wet and compacted (in particular zones) if there was a poor or incorrect soil mix, incorrect construction, a migration of silt or other fine particles into a layer, poor internal tile drainage techniques, etc.

With insufficient soil permeability and continued rains and/or unrelenting irrigation, all pore spaces become saturated with water to the exclusion of air (oxygen). Couple this with warm summer soil temperatures and the presence of some organic matter, and anaerobic processes, indicated by the blue-black color and foul smell, naturally set in. Normal growth requirements are destroyed, and the plant dies.

How to correct or prevent the phenomenon? Step one is to drastically curtail or stop all irrigation, including syringing. Dry out the green. Aerify, spike or slice, even in the middle of summer. Get air back into the rootzone. Syringe only when moderate to severe blue wilt or footprinting develops, and even then syringe only for a minute or two over the entire green. Do not irrigate. It may be several days or even weeks (depending on climatic conditions) before new irrigation is needed. There must be a longer period for drainage between future irrigations. A very light dusting (two pounds per 1,000 square feet) of hydrated lime following aeration or spiking may also be helpful.

As Professor L. S. Dickinson once said, "Help the little grass plant grow. Don't try to make it grow." Words of wisdom.

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GOLF COURSE RENOVATION: A Case Study

By Jim Rodgers, Lohmann Golf Designs

Golf has reached a new level of popularity, with more people playing the game than ever before. Due to this high level of popularity, more is expected from golf courses, not only the private clubs, but also the public courses. For this reason, many older courses are initiating renovation programs to help meet modern expectations. A renovation project may consist of correcting unsafe conditions for the golfer, or alleviating drainage or maintenance problems on a course.

The first step in any renovation program is to establish the parameters within which the work will take place. This can be established through the development of a Master Plan for the entire golf course. A specific goal of the Master Plan is to show what the course will look like at the completion of the renovation. Also, use of the plan eliminates the redoing of already completed work because a different result is desired. Thirdly, overall costs can be reduced by completing the work in several areas at the same time.

For the purpose of illustration, we will look specifically at the renovation program currently underway at Randall Oaks Golf Club in West Dundee, Illinois. The Master Plan was completed in the Spring of 1986, and then we were ready to begin work.

The first phase of construction included excavation of a pond and the elevation of No. 17 fairway that drained poorly. The fairway elevation work would take up a major portion of the soil excavated, but we needed to determine what to do with the remainder. The Master Plan called for some mounding along the opposite side of the fairway and building a new tee. The adjacent 11th hole also required some mounding and two new tees. This project would complete the majority of work on these two holes.

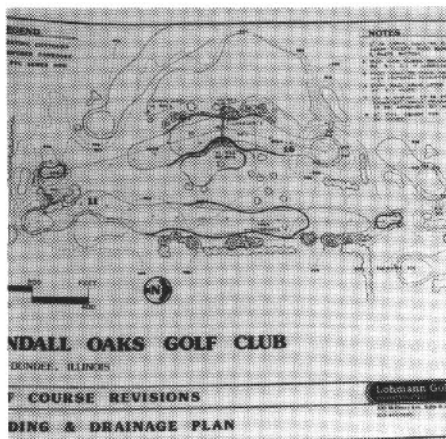
The next stage was to complete working drawings, prepare cost and quantity estimates, and plan exactly when the work would take place. A field



Sometimes outside contractors and equipment are needed for construction.



Pond excavation — from plans to the field.



Grading and drainage plan.

survey to find exact locations of sprinkler heads was combined with a topographic map to ensure accurate quantity estimates and field layout. We worked closely with the superintendent to establish what work could be contracted out and what could be completed by the club. Obviously, the more the club can complete, the lower the overall cost.

The size of the pond was dictated by the soil necessary to complete the other work. Therefore, we needed to determine size of mounds and how much to elevate the tees. This was a back-and-forth process between excavating the necessary soil and making the pond of adequate size and depth to be a positive addition to the golf hole.

The pond was positioned at the corner of a Par 4, slight dogleg right. It was out of range of the average golfer's tee shot and pinched the fairway at 220 yards. For the long hitter, a 240-yard carry over the back edge of the pond would leave a pitching wedge to the green.

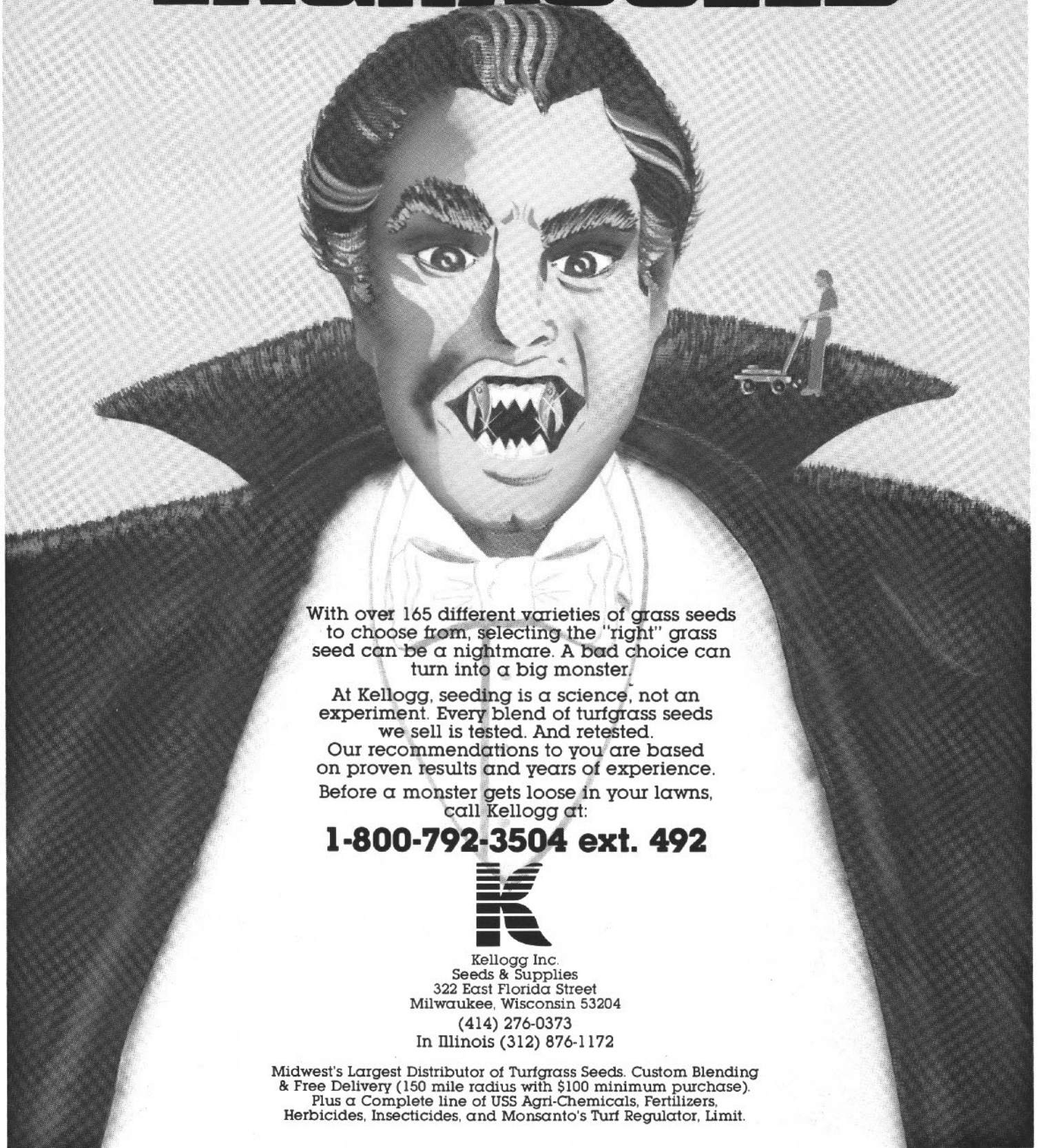
A set of specifications was also prepared to ensure that the work was done properly. These specifications included the bid proposal and the bonding requirements of the contractor.

The bidding process is sometimes a difficult one, which proved to be true in this case. The bids were rejected because they exceeded the budget, so it was decided to work the project on a time-and-material basis.

Once a contractor was selected, layout work could begin. We staked out the shapes of the features to be constructed and marked the finished elevations of the proposed grading.

Construction began on September 14. This date was chosen because the major portion of the golf season was over. And it would also allow us to complete seeding by the end of September. Everything went according to schedule the first few days, but then the heavy Fall rains set our schedule back by several weeks. Eventually, all the excavation and rough grading were completed, as well as most of the finish grading. A pipe connecting the pond with an existing pond was also installed to maintain a constant water level.

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