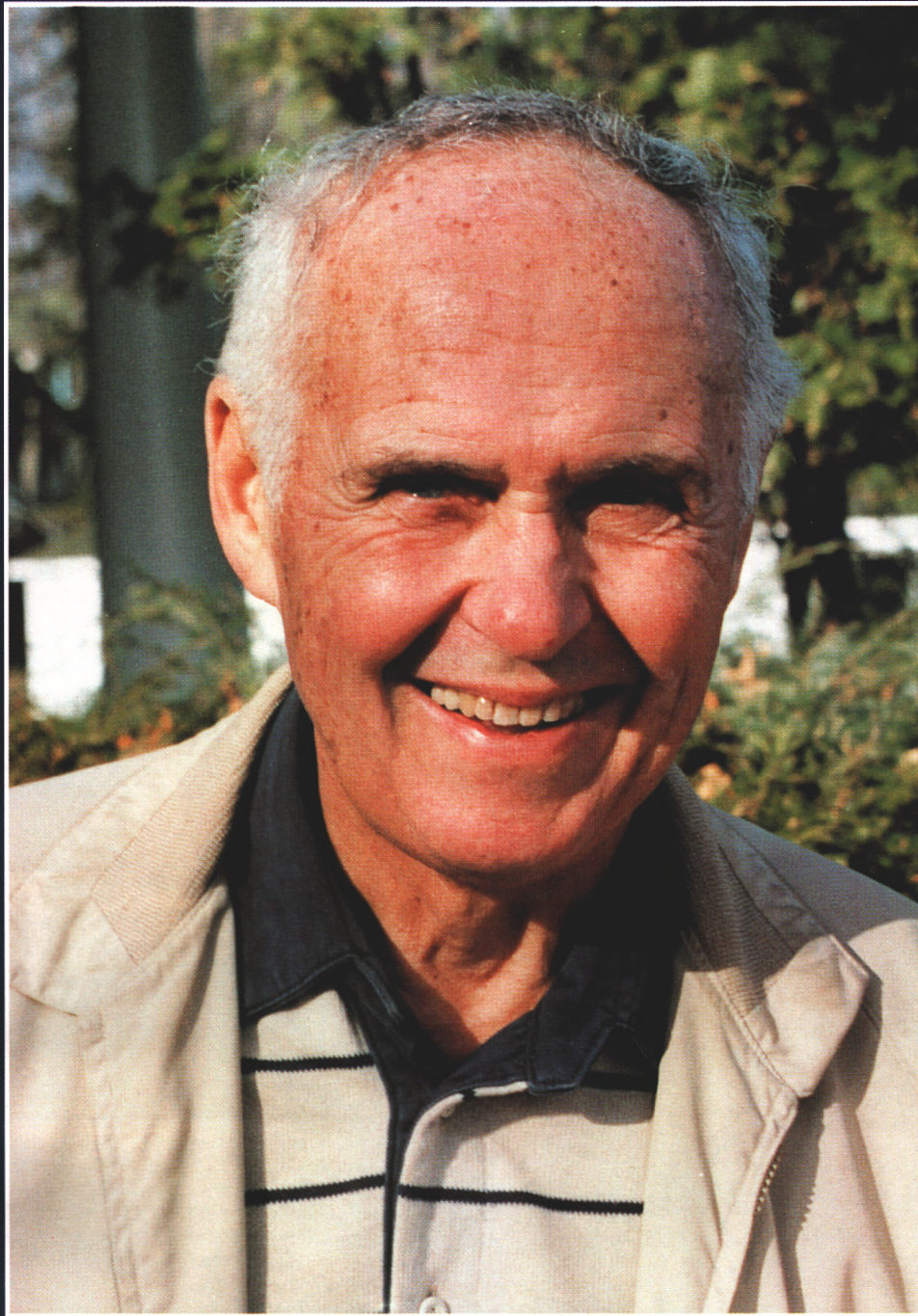


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Dr. Kenyon T. Payne
1994 Green Section Award Recipient



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USGA PRESIDENT:
Reg Murphy

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26101 Northwestern Highway, Southfield, MI 48076

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NATIONAL OFFICES:
United States Golf Association, Golf House
P.O. Box 708, Far Hills, NJ 07931 • (908) 234-2300
James T. Snow, *National Director*
Dr. Kimberly S. Erusha, *Director of Education*

P.O. Box 2227, Stillwater, OK 74076 • (405) 743-3900
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GREEN SECTION AGRONOMISTS AND OFFICES:

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United States Golf Association, Golf House
P.O. Box 708, Far Hills, NJ 07931 • (908) 234-2300
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Mequon, WI 53092 • (414) 241-8742
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Mid-Continent Region:
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Western Region:
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Lake Forest, CA 92630 • (714) 457-9464
Paul H. Vermeulen, *Agronomist*
Patrick J. Gross, *Agronomist*

Turfgrass Information File (TGIF) • (800) 446-8443

USGA® Green Section RECORD

1 Kenyon T. Payne — 1994 Green Section Award Recipient

2 Golf Keeps America "Green"
A New Attitude: Audubon, Our Golf Course,
and the Community by Peter V. Leuzinger

THE BEST TURF TIPS OF 1994

6 Mr. Wizard Visits the Golf Course by James F. Moore

8 Go Wireless by Chuck Gast

9 Armchair Architect by Patrick J. Gross

11 Underground Photography
by Paul Vermeulen

12 The Economic and Operating Impacts of Golf Courses
by Richard L. Norton

THE BEST TURF TIPS OF 1994

14 Blockbuster Aerification by Patrick M. O'Brien

15 Getting the Word Out by John H. Foy

16 Covering Up For Winter by Jim Skorulski

17 Have an "Ice" Day by Robert C. Vavrek, Jr.

19 Sand Bunkers: Old and New by Joseph G. Baidy

THE BEST TURF TIPS OF 1994

21 No More Rolling Stones by David A. Oatis

23 Low-Cost Comfort at Deadwood by James M. Latham

24 A Method of Recycling: From Clippings to Compost
by R. A. (Bob) Brame

25 Cupit's Narrows by Larry Gilhuly

26 Strategies for Successful Long-Term Maintenance
of Golf Courses by Ben Crenshaw

THE BEST TURF TIPS OF 1994

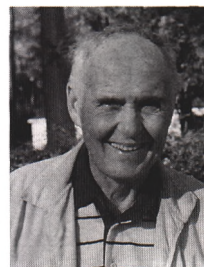
29 Seed Storage: Protect Your Investment by Keith Happ

30 Every Picture Tells a Story by George B. Manuel

31 Mobile Office Trailers as Interim Offices by Stanley J. Zontek

32 News Notes for Spring

Back
Cover Turf Twisters



Cover Photo:

Dr. Kenyon T. Payne, recipient of the 1994
Green Section Award.

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Kenyon T. Payne — 1994 Green Section Award Recipient

USGA JOURNAL AND TURF MANAGEMENT, NOVEMBER 1991



Dr. Payne added his expertise to fellow leaders in the turfgrass industry. From left to right: Ian Forbes, USDA; B. P. Robinson, Georgia; Jack Harper and Prof. H. B. Musser, Penn State; A. M. Radko and Dr. Fred V. Grau, USGA Green Section; J. M. Boyce, Ottawa, Canada; H. L. Lantz, Iowa; James Tyson, Michigan; Dr. J. A. DeFrance, Rhode Island; Ed Merkel, Penn State; K. T. Payne, Purdue.

Dr. Kenyon (Ken) T. Payne received the USGA's 1994 Green Section Award at this year's Golf Course Superintendents Association of America Conference in Dallas, Texas. This annual award honors persons for distinguished contributions to golf through work with turfgrass. Thomas W. Chisholm, Chairman of the USGA Green Section Committee, presented the Green Section Award on February 7, 1994.

The award was accepted on Dr. Payne's behalf by Gerry Faubel, Past President of the GCSAA and longtime friend of Dr. Payne. Upon hearing about his selection as the 1994 recipient, Dr. Payne responded, "This is the most prestigious award I have ever received. I am very grateful."

Fondly referred to as "Doc" by many of his students, Dr. Payne's contributions to the turfgrass industry continue through the 800-plus students he diligently guided and trained throughout his career. As chairman of the Department of Crop Science at Michigan State University, Dr. Payne recognized the need to have a strong turfgrass research program. He served as a strong moving force

in initiating the two-year Golf Turf Program at MSU, and after the initial coordinator left the University in 1968, Dr. Payne took over the duties of coordinating the program.

Under Dr. Payne's direction, the program grew in numbers and stature to the point where it is now recognized as one of the strongest in the country. One of the unique strengths of the program under his leadership was the emphasis Dr. Payne placed on encouraging his students to remember the importance of personal values, relationships with people, and contributions to the community. Many of the nomination letters for the Green Section Award included supporting comments from golf course superintendents who emphasized their gratitude for the education Dr. Payne shared, not only in turfgrass, but in life as well. Dr. Payne and his wife, Jane, played host to many student get-togethers that served as morale builders that carried into the classroom. One former student noted, "There are those who love their job, but there are few who love those they are serving."

During his tenure at Michigan State, Dr. Payne worked in turfgrass breeding, in cooperation with Dr. Joe Vargas, to develop leaf-spot-resistant fine fescue cultivars. He was instrumental in the organization of the Michigan Turfgrass Foundation and the MSU Turf Club. Working closely with undergraduate students, he also was actively involved in restoring antique golf course maintenance equipment. He hunted high and low for ancient replacement parts, nearly having to beg for the funds to cover restoration expenses. He proudly gave enthusiastic tours of the gleaming relics to interested campus visitors.

In 1948, Dr. Payne received his Ph.D. in agronomy and plant genetics from the University of Minnesota. He became Assistant Professor at Purdue University with responsibilities in teaching and breeding of turfgrasses (creeping bentgrass and zoysiagrass) and forage crops. He joined Michigan State University as Professor in 1952 and was named Department Head of Farm Crops in 1959. He left Michigan in 1964 to serve as Dean of Agriculture at the University of Nigeria in Ksukka, West Africa, and rejoined MSU two years later as Chairman of Farm Crops.

During his career, Dr. Payne was named a Fellow in the American Society of Agronomy and Crop Science Society of America. He was the recipient of the Meritorious Service Awards from both the Michigan Turfgrass Foundation and the GCSAA. He also was a member of The Golf Collector's Society and the International Turfgrass Society.

After retiring in 1988, he formed Executive Golf Search, an industry placement service for golf course superintendents. He continued consulting with golf courses, and counseling and guiding the careers of many of his students.

One of Dr. Payne's favorite sayings is, "No telling how far a person can go in the world if he doesn't care who gets the credit." Dr. Payne's behind-the-scenes efforts have made this philosophy work for his life.

Golf Keeps America "Green"

February 7, 1994, Dallas, Texas

FOR THE 13TH CONSECUTIVE YEAR the annual Green Section Education Conference was held in conjunction with the Golf Course Superintendents Association of America International Turfgrass Conference and Show. This year more than 1,400 people attended the Green Section's program on Monday, February 7, at the Dallas Convention Center. James T. Snow, National Director of the USGA Green Section, introduced the afternoon's program of 20 speakers who addressed this year's theme, "Golf Keeps America 'Green'." Following are the full proceedings.

A New Attitude: Audubon, Our Golf Course, and the Community

by **PETER V. LEUZINGER**
CGCS, St. Charles Country Club

I REMEMBER the first time I received a telephone call from a complete stranger wanting to know, "Who's in charge of chemicals on the golf course?" That person was convinced the golf course was responsible for a sudden queasiness he felt after he drove by the golf course earlier that day. I will never forget my feelings. Through the entire conversation I felt defenseless, off guard; yet the whole time I kept thinking, "Why me? I care. I'm a good guy. This isn't fair. We haven't done anything wrong!"

I'm not sure exactly what I said. I hoped it was the right thing. I do remember that I was terribly uncomfortable with that conversation. By the same token, I knew that I was not an environmental saboteur. Quite the contrary! I have always been happy with the opportunity to work outside on a golf course. I know Bob Newhart, television psychiatrist, would have handled a difficult conversation



Peter V. Leuzinger

on the telephone better than I did. It was important for me to fix my bad feelings.

That's why in 1991 I was so happy to see a reputable ally come to our side and help good golf course superintendents with good management programs defend their programs. The USGA provided funding to The Audubon Society of New York State, Inc. (ASNYS), to form the Audubon Cooperative Sanctuary Program for Golf Courses (ACSP). Ron Dodson, President of The Audubon Society of New York State, golfer, and nature lover, knew that golf courses can make very good wildlife sanctuaries. He met with USGA officials and they decided to promote golf course management with wildlife and environmental quality in mind. Ron received a \$30,000 grant the first year, hired some staff, organized a program, and with the help of the USGA began to introduce the program to the nation's golf courses. With three suc-

St. Charles Country Club

Nature Walk

The 60 wooded acres north of the Clubhouse not only provides a buffer zone for the golf course, but also contains a beautiful walk for nature lovers. Our trails provide 2.4 miles through a variety of habitats typical of Northern Kane County. Woodlands, waterways, wetlands, and prairie can be observed and enjoyed all four seasons of the year, truly an educational experience.

Diversity of habitats provides a home for a wide range of plants and animal species, offering year-round opportunities for visitors to expand their awareness of the natural world.

St. Charles Country Club is a Certified Audubon Cooperative Sanctuary. The Nature Walk is a key part of our program. We are very proud of the fact that our golf course and surrounding grounds are managed with wildlife in mind.



Walk trail perimeter
net, and our
site for hearty
are common

St. Charles Country Club has successfully established a nature trail, used by members and for invited group outings, such as Cub Scouts and grade school tours. A simple pamphlet details their Audubon Cooperative Sanctuary Program projects.

cessive \$100,000 grants and three full years under their belts, over 1,100 golf courses have enrolled in the program.

This is how the program works: For a small fee, \$100 per year, your golf course becomes a registered member of the ACSP. You will receive a resource inventory handbook asking specific questions about your property (e.g., size, specific habitat, etc.) and a subscription to *Field Notes*, the Cooperative Sanctuary newsletter. Once the resource inventory handbook is completed and returned to ASNYS, you will receive an Audubon Cooperative Sanctuary Report prepared exclusively for your golf course, recommending appropriate conservation and habitat enhancement projects.

There are seven categories for certification in the ACSP:

1. Environmental Planning
2. Wildlife Food Enhancement
3. Wildlife Cover Enhancement
4. Public Involvement
5. Integrated Pest Management
6. Water Conservation
7. Water Enhancement

You can apply for certification in one or more categories. To be fully certified in all seven categories, each category must be reported to the ASNYS and the criteria met. Jean Mackay, staff ecologist at ASNYS and a good friend, tells me 15 courses are fully certified. They are:

Kapalua Bay Course, Hawaii
St. Charles Country Club, Illinois
Aurora Country Club, Illinois
Village Links of Glen Ellyn, Illinois

Cantigny Golf Course, Illinois
Evanston Golf Club, Illinois
Tampa Palms Golf and Country Club, Florida

Prairie Dunes Country Club, Kansas
Applewood Golf Course, Colorado
TPC of Michigan, Michigan
Apple Creek Country Club, North Dakota

Ozaukee Country Club, Wisconsin
Breckenridge Golf Club, Colorado
Semiawmoo Golf and Country Club, Washington

Hole-In-The-Wall Golf Club, Florida

Jean reports that 45 more golf courses have received 185 certificates, which means more courses are likely to receive full certification this year. We also are happy to see that the ACSP has established recertification



Nest boxes not only provide homes for resident birds, but also send a subtle message about environmental awareness.

guidelines to insure ongoing commitments from those certified golf courses.

I have been asked to share some ideas for the certification category projects. When it comes to trying new things, it is fun to find out what other people are doing. This is one reason a good resource committee works so well. Their talent and interests can add a lot to the program you are trying to get started.

You can form a resource committee to help you plan and implement your projects. A resource committee can be made up of fellow employees, golfers, and even people outside the golf course who bring expertise to the

group. There are many people out there who are willing to donate their time and add their name to a project like the ACSP. Our resource committee consists of a writer/promoter, a bird watcher, a handyman who builds and repairs bird houses and feeders, a craftsman, one outdoor lover, and a local landscape architect and folklore expert. Combine these talents with a golf course superintendent who is used to wearing many hats, and you will be surprised how fast your programs take shape!

Our whole program is based on the premise that our golf course is an asset to

the community. It is this kind of attitude that a good resource committee can really help generate. The resource committee's work improves the public's perception of the golf course as part of the community. Our ACSP is the best promotion we have ever had. Telephone calls coming into our office are congratulatory, rather than negative. We no longer feel defenseless. We have a good program and a whole new attitude.

For those of you who have a hangup with public involvement, I think we can help. A private country club especially needs to find ways to gain public trust. There are plenty of

ways to get the public involved without losing the privacy your club enjoys. How do we reach the public? Try any or all of these ideas. Remember, it is a matter of attitude:

1. Press Releases: The ACSP will help you reach local papers with announcements about your environmental programs. You may strike up some friendships and develop some very positive reaction from the press. There is nothing like a front-page picture to bring positive attention to your golf course.

2. Brochure: Make some simple pamphlets that detail your ACSP work. Leave the pamphlets at the reception desk, pro shop, and lounge. Make your pamphlet available at career day and the local garden club. Toot your horn a little!

3. Speaking Engagements: We all need to develop our communication skills. One wonderful way to do this is to begin talking to small groups, develop a slide presentation, and go on from there. For example, I never dreamed I'd be explaining the ACSP program to over 1,000 people attending the annual USGA Green Section Education Conference.

4. Newsletter Articles at your golf course are a natural. You need new subject material anyway. How many times can you talk about defending your green speed?

5. Tours: Very basic golf course tours have a great impact on public perception. A successful outing demonstrates goodwill that will spread by word of mouth. Tour

groups might be made up of grade-school children, young adults, biology clubs, Cub Scouts, senior golfers, women's golf leagues, college students, local golf course superintendents, and don't forget the "press." Not only will you spread the word about the ACSP, you may even recruit a future horticulture student.

6. Nesting Boxes: These can be used as a tool for reaching out to the community. Giveaways to golfers, schools, or the local cemetery association are greatly appreciated and stimulate interest in your ACSP. We make extra bluebird houses every year. We have 44 nest boxes on the golf course and roadway along the course. This subtle statement along the roadside is sending a message to local traffic around our course.

7. Establish a Library: Books on natural habitat, building nest boxes, butterflies, bird identification, and environmental issues are a worthwhile service to your golfers, and they can be checked out at the club.

8. Outreach Programs: Give the public an opportunity to use your grounds for something other than golf, e.g., local photography club, group art classes, and birders during the migration season can all benefit from the golf course.

9. Wildlife Reports: Have golfers get involved in reporting and monitoring wildlife. Provide the golfers with maps of the course and let them help you take inventory of the varied wildlife on the property.

10. Craft Projects: These projects may help provide funding for supplies needed for the ACSP. Wreaths made from wild grapevine and bittersweet are unique and popular. Just make sure to tag these as ACSP promotions.

These are just a few of the ideas we have seen work. Our new attitude is becoming infectious. *Coach* is a popular television show that always concludes with a meaningful anecdote. The following quotation by an unknown author is something we like to share with new friends.

Attitude

"The longer I live, the more I realize the impact of attitude on life. Attitude, to me, is more important than facts. It is more important than the past, than education, than money, than circumstances, than failures, than successes, than what other people think or say or do. It is more important than appearance, giftedness, or skill. It will make or break a company . . . a church . . . a home. The remarkable thing is we have a choice every day. We cannot change our past . . . we cannot change the fact that people will act in a certain way. We cannot change the inevitable. The only thing we can do is play on the one string we have, and that is our attitude . . . I am convinced that life is 10 percent what happens to me and 90 percent how I react to it. And so it is with you . . . we are in charge of our attitudes."



A golf course provides school-children an opportunity to explore and be intrigued by nature. You may even recruit a future horticulture student.

The Best Turf Tips of 1994

One of the most popular annual features of the Education Conference is the Best Turf Tips. This year, 15 of the Green Section's agronomists reported on some of the helpful ideas and ingenious innovations they came across while visiting golf course superintendents in every part of the country during 1993. The Turf Tips appear throughout this issue.

Mr. Wizard Visits the Golf Course

by JAMES F. MOORE

Director, Mid-Continent Region, USGA Green Section

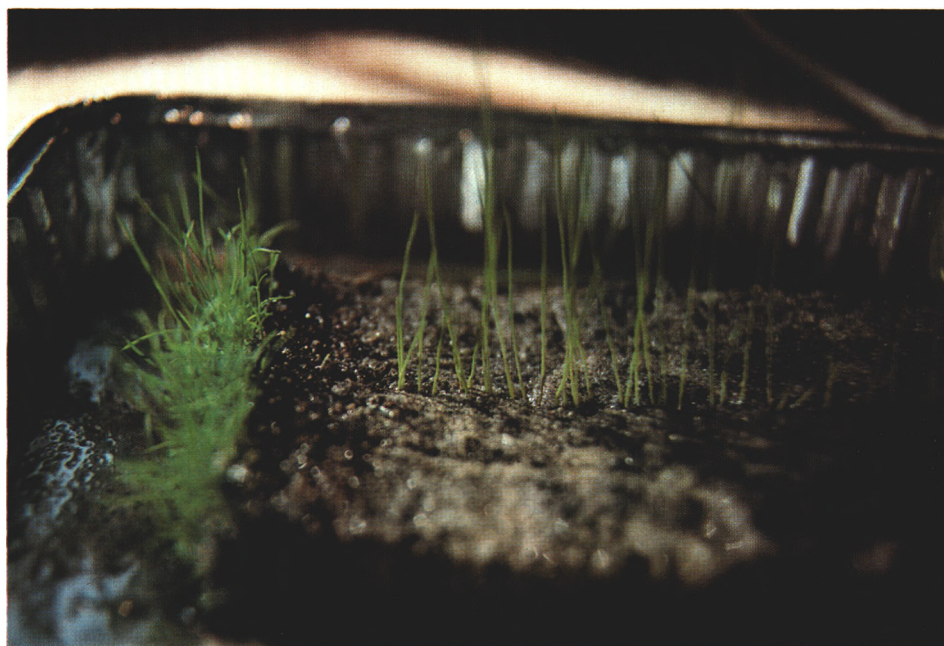
MR. WIZARD was famous for using practical and highly visual demonstrations to allow us all to better appreciate the subtleties of nature. The following three turf tips would make Mr. Wizard proud. They will help the golf course superintendent better diagnose problems and give him or her visual tools to help explain the ramifications of these problems to the golfers.

Tip #1 — A Simple Bioassay

Put yourself in one of these situations. Severe damage has occurred to your course. You suspect chemical damage from either vandalism, product contamination, or perhaps runoff from a neighboring area. Or perhaps you applied a preemergence herbicide a few months back but now need to overseed and are wondering if the herbicide will let the new seed germinate.

In either case, you need to quickly determine if the chemical is still affecting the turf. Dr. Wayne Bugg of the Monsanto Company uses a simple, field bioassay to make this determination.

A soil profile tool is used to remove a sample from the affected area. The slice of soil is carefully placed flat into a dish or pan. A knife is used to cut a small groove in the profile extending from the top of the sample (where the turf is) to the bottom (the deepest part of the profile). Ryegrass or bentgrass seed is carefully placed into this slice, much as if you were planting radish seeds in a garden. The profile sample is watered well and the pan is then covered with plastic food wrap to prevent it from drying too quickly. Within three to four days, the seed will begin to germinate — if it can. If it cannot, you



A soil profile can provide a visual indication of where in the root zone the chemical is affecting the turf.

should be able to determine the depth at which the chemical is causing problems. If you are considering trying to deactivate the chemical with activated charcoal, knowing the depth of the chemical's influence will help you predict how deeply the charcoal will need to be incorporated into the profile. Carrot or clover seed can be used to help identify broadleaf chemical influence while ryegrass and bentgrass seeds are best for grass-control herbicides.

Tip #2 — A Water Quality Test Everyone Can See

Golf courses in many parts of the world are finding it necessary to use less-than-ideal quality water. Although most superintendents are aware of the necessity to analyze the quality of the water from a chemical standpoint, an often overlooked parameter of water quality is its cleanliness. Water high in suspended particles such as silt, clay, and

organic matter can cause a great deal of damage. This is particularly true in the case of greens where great effort has been taken to construct an extremely uniform, layer-free root zone. Given the amount of water used on greens, it is easy to understand how “dirty” water can quickly cause problems.

It is easy to understand — but not easy to see. The accumulation of a layer of minute particles takes time and is extremely subtle. This turf tip compresses time to give a visual estimate of the result of a year’s worth of irrigation.

Water should be collected from the sprinklers or the intake area of the pump station. Estimate how much water is applied to the greens over one year through the irrigation system. For this example, we will use 30 inches. Buy the largest rain gauge you can find and fill it with the sample you collected. Let’s assume the gauge holds 5 inches. Allow the sample to sit for a few days and observe the particles that settle to the bottom. Once the sample is clear, measure the depth of the sediment. Multiply this depth by 6 in this case (to equate to 30 inches), and you have an idea of what would be applied to the surface of the greens over the year.

Obviously, this is a very rough test and should not be used in place of professional laboratory testing. Also, the quality of your water may vary from month to month or even day to day if you are in an area that receives a lot of runoff. However, this simple test can help illustrate the magnitude of sediment that could be applied to greens and should help convince others of the need for clean water.

Tip #3

A final way to achieve a closer look at what nature may have planned for you is to construct your own microclimate and manipulate the environment to your liking. Most of us have seen the complex growth chambers turfgrass scientists use to simulate a particular set of environmental conditions. Turf samples are often placed in such chambers to incubate diseases, evaluate the extent of winter injury, etc. Although much more crude, a tremendously less expensive “botany bottle” or “biosphere” can be constructed out of plastic 2-liter soft drink bottles and can prove amazingly helpful to the golf course superintendent.

For example, it is often difficult to identify the disease organism responsible for damage to turf. Somehow, the pictures in the disease identification manuals seldom look much like what you actually see on the turf. However, by placing a turf sample in a botany bottle, a microclimate can be created



Soft drink bottles and cup cutter plugs are all that is necessary to construct a simple biosphere.

that will force acceleration of the disease, making fruiting bodies, mycelium, and the damage symptoms themselves much easier to identify. This can also give the superintendent insight into what organisms are present in the sample, just waiting for the right combination of heat and humidity to occur.

A superintendent might also use a botany bottle to determine if turf is still viable after extreme low temperatures. It is extremely difficult to assess the viability of dormant bermudagrass — particularly when overseeded with ryegrass or other winter covers. However, a plug removed from an over-

seeded green can be placed in a botany bottle and subjected to “instant summer,” which in turn will result in the breaking of bermudagrass dormancy — assuming it is still viable.

Botany bottles should also give the superintendent an easy method of evaluating seed germination percentages and help in the identification of grasses — much easier when turf is allowed to grow to greater heights.

These three quick and easy-to-accomplish tests will help every superintendent peek just a little closer into the day-to-day changes taking place on the course and perhaps head problems off before they occur.

GO WIRELESS

by **CHUCK GAST**

Agronomist, State of Florida, USGA Green Section

IF YOUR DESIRE is to provide your golfers with readily accessible emergency communication equipment, but the thought of plowing a trench through every hidden irrigation control wire and pipe to install a "land-line" system gives you the chills, have I got an idea for you. Go wireless!

The popularity of golf continues to increase year after year. Over 25 million people now participate in this game, which is becoming one of the favorite recreational activities in the country. Unfortunately, along with this increase, golf-related injuries have also increased. A recent survey from the Consumer Products Safety Commission states that nearly 39,000 golf-related injuries resulting in hospital emergency room treatment occur annually in the U.S. Of these, heart attacks and other life-threatening situations are of significance. Furthermore, an additional 6,500 golf-cart-related injuries occur on an annual basis. Therefore, the need to provide fast and efficient emergency communication on today's golf courses is an important issue.

With the use of cellular phone systems and the expanded use of two-way radio systems, the installation of effective emergency communication equipment on the golf course has never been so easy.

At the Woodmont Country Club in Tamarac, Florida, superintendent Willie Townsend is in the process of installing a Motorola two-way radio Medical Alert Call



The installation of emergency call box systems on golf courses has been streamlined through the use of wireless communications equipment.

Box System. This system is self-contained and requires only a low-amperage draw of approximately 300-350 milliamps from the power supply of the irrigation system to operate properly. This electrical tie-in to the irrigation system also maintains a full charge on the backup battery pack enclosed within the epoxy-coated stainless steel call box. The radio antenna is hidden safely from view within the PVC enclosure on top of the mounting pole.

Operation of this system is quick and easy, eliminating confusion during a crisis

situation. When the door to a call box is opened, the central receiving station in the clubhouse is automatically signaled to provide the specific location from where the call is being originated. As contact is made with the central receiving station, the caller simply presses the talk button to describe the nature of the emergency through the microphone / speaker mounted in the call box. The operator of the central receiving station can then notify the appropriate emergency personnel and, when the emergency unit arrives at the clubhouse, this person can provide specific directions to the location on the course where assistance is needed.

These particular call boxes also can be locked at night to prevent vandalism. At early dawn's light the next morning, each box should be unlocked to allow operation should an emergency arise.

As can be imagined, the versatility of this

type of communication system through differing frequencies is virtually limitless and could be adapted to various areas of the clubhouse and pro shop operations.

At the Frenchmans Creek Yacht and Country Club, in Palm Beach Gardens, Florida, this very idea has been expanded upon. Mr. David Holler, CGCS, has in place emergency call boxes in strategic locations on approximately every other hole throughout the 36-hole complex. In addition to providing a direct line to the security office for emergency situations, four boxes located on



Dave Blasiman, assistant superintendent at Frenchmans Creek Yacht & Country Club, demonstrates the use of this solar-powered, multiple-use emergency/halfway house call box system.

the eighth and 17th holes of both the North and South Courses have an additional button to provide communication to the halfway house to allow for a quick snack at the turn.

As pointed out by Mr. Dave Blasiman, assistant superintendent at Frenchmans Creek, each box is numbered for identification purposes. However, similar to the previous system, each box is automatically identified at the central receiving station when the door to the unit is opened.

This particular equipment, manufactured by GTE (813-273-3000), is in fact a solar-powered cellular phone system. Each call box unit is fully self-contained and, due to solar power, requires no electrical tie-in to an outside source. Therefore, these units can be placed virtually anywhere on the golf course where sunlight is not obscured. Each unit also contains an enclosed battery pack that maintains a full charge from the solar collectors to provide supplemental power during extended periods of low sunlight exposure.

To ensure consistent operation, each unit at Frenchmans Creek sends out a status report once per week to verify proper operation and battery levels. Should a battery become weak, a default system kicks in to notify the central unit of the situation. According to the installer of this system, only one battery pack has had to be replaced in the 18 units since installation of the system in the fall of 1992.

The whole concept of this type of wireless emergency communication system is tremendous and the versatility is unlimited. For example, the possibility of utilizing this equipment to interface with early warning lightning detection systems also exists. The ability to add horns or sirens on call box stations in strategic areas throughout the course to provide warning of dangerous weather conditions can further add to the safety of golfers.

As the popularity of golf continues to increase, the number of hours people spend on the course in pursuit of this pastime will also increase. Without question, the primary consideration of any successful golf course operation should be to provide the best possible emergency communication network to assist in providing optimum safety on the golf course. Although the expense of these golf course "extras" can be significant, what dollar value can be placed on the health and safety of the golfers who use the course?

Considering the dependability of this emergency communication, there should be no more excuses. Installation is easy and painless, and operation of the equipment is simple. Swing smoothly, rest easy, and go wireless.

Armchair Architect

by **PATRICK J. GROSS**

Agronomist, Western Region, USGA Green Section

KEEPING the golf course open for play during an extensive renovation project can be a difficult and challenging experience. Bill Martin, CGCS, of the Victoria Golf Club in Riverside, California, was faced with such a challenge when his proposal to renovate the fairways and plant hybrid bermudagrass was accepted by the membership. The only condition was that the board of directors demanded that the course be kept open for play during the entire renovation process.

The solution was to renovate nine fairways at a time and design an 18-hole course using the remaining nine holes. This is how this innovative idea was put into action.

Members would play two nine-hole rounds from different tees to different holes on the greens. White tee markers and flags were used for the first nine, and blue tee markers and flags for the second nine. The forward tees were designed using red markers and red stones. The different tee locations provided a different yardage each time the

hole was played and generally required different club selections. By using alternate tee locations, it was also possible to change the angle of approach to some greens. For example, hole No. 3 played as a dogleg right from the regular tees. On the second nine, this same hole played as a dogleg left by using the championship tee from an adjoining hole.

Placing two holes in each green made it possible to provide different putting characteristics each time the hole was played. The

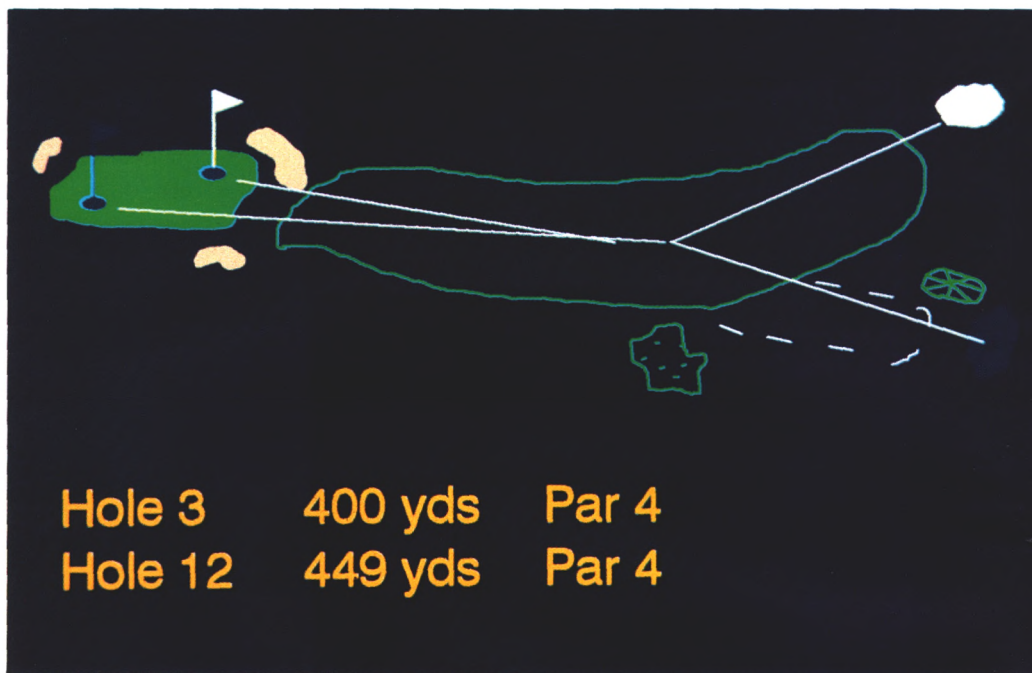


mowing height on the *Poa annua*/creeping bentgrass greens was raised to $\frac{3}{16}$ " to handle the extra volume of play. This also slightly decreased putting green speed and made it possible to reclaim previously unusable hole locations.

There are some practical considerations that must be addressed if you wish to implement this plan at your course. The first priority is to insure safety. Don't create a shooting gallery with crossing fairways or other dangerous features. Also, players should be instructed that only one group at a time is allowed to play each designed hole. Next, provisions must be made to alternate groups for those making the turn after nine holes. No problems were reported with this system at the Victoria Club; however, it may be necessary to increase the tee time intervals at busier courses. This will help to avoid a traffic jam on the first tee.

Two additional benefits of this plan were that it required minimal cost and the course was able to maintain its course rating.

Overall, the fairway renovation project was a tremendous success. The entire course was back in play within 12 weeks, and plans are in place to complete the remaining nine holes in 1994. If you are faced with a big renovation project in the future and you have to keep the course in play, you may want to get creative and try your hand at being an "armchair architect."



(Top) Raising the height of cut on the greens provides improved turf resiliency and makes it possible to recapture previously unusable hole locations.

(Above) An 18-hole course can be created by playing two nine-hole rounds from different tee locations to different hole placements.

UNDERGROUND PHOTOGRAPHY

by **PAUL VERMEULEN**

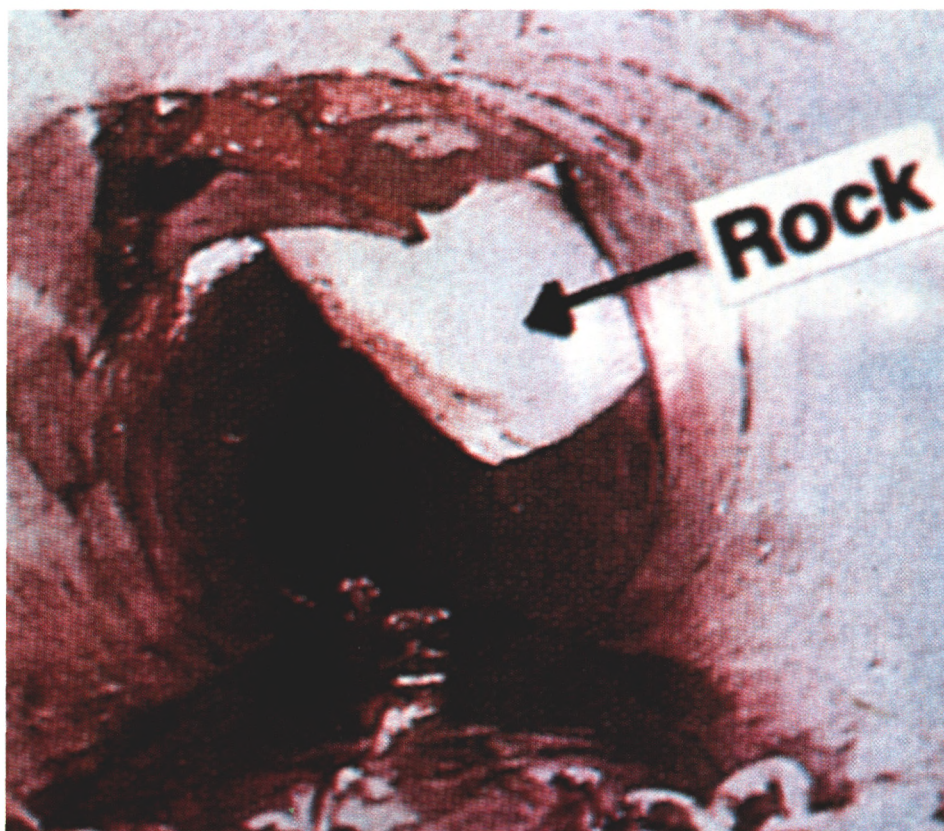
Agronomist, Western Region, USGA Green Section

ONE OF THE special challenges that golf course superintendents must address from time to time is to support or justify one of their own claims about the condition of the course to course officials. For many superintendents, however, the evidence supporting their claims is often intangible or very technical in nature, and therefore difficult for officials to accept or understand.

In one particular case that developed at the Arizona Country Club, superintendent Kirby Putt had claimed that newly constructed greens were suffering from soluble salt accumulation due to poor subsurface drainage. In most cases, poor subsurface drainage can be clearly identified by a visual examination of the soil profile, where restrictive soil layers and/or anaerobic conditions (black layer) can be seen. In this case, however, clear evidence could not be seen in the newly constructed greens. Given these circumstances, Kirby Putt was led to assume that the problem must be associated with crushed or missing drain lines.

Here was his challenge: how could Kirby show the golfers that the new greens were suffering from poor drainage when the problem drain lines were buried below the green itself? In other words, what evidence could be presented that would support the claim that the newly constructed greens were not built according to USGA specifications? Remember also that the golfers had paid a great sum of money for the new greens, and they were somewhat reluctant to accept the notion that they had received less than what they had thought they paid for.

To meet the challenge of providing overwhelming evidence that the new greens were failing due to poor subsurface drainage, as opposed to having received poor maintenance practices, a small, special video camera was inserted into the drainage system through one of the flush-out points. This camera was rented from a sewer cleaning service and clearly showed on a video monitor the exact point at which the drain-



Underground photography can provide a method of clearly showing where the problem lies.

age system had been crushed by large earth-moving equipment, equipment that should not have been used for installing either the gravel layer or the intermediate layer of a USGA green.

Like a skilled trial lawyer, superintendent Putt presented his case using evidence that could be clearly understood by the golfers and was in fact impossible to refute. Because of this careful presentation, the outcome of this case was that the golfers were able to

appreciate what the exact trouble was and supported the greens' immediate repair.

In closing, this turf tip may appear at first glance to be the use of video equipment to investigate a problem that could not otherwise be seen. In reality, however, the turf tip presented here is that providing clear evidence is the easiest and most effective means of supporting one's claim. Without it, superintendents must rely on the golfer's faith, which in many cases is unpredictable.

The Economic and Operating Impacts of Golf Courses

by **RICHARD L. NORTON**
Vice President, National Golf Foundation

MORE AND MORE golf course managers and superintendents today are having to deal with laws and regulations that directly impact the operating viability of their facilities. They also need good sources of operational information upon which to base business decisions.

Over the past year, the National Golf Foundation (NGF) has developed several new publications that have proven capable of helping managers and superintendents to educate green committees, regulators, and lawmakers on the economic contributions and operating characteristics of golf courses. These publications are particularly useful in helping non-golfers understand the real business of golf and the negative impacts tax levies, restrictive regulations, and legal applications can have on the community, not just the golf facility.



Richard L. Norton

Economic Impact Studies

Regulators and legislators are impressed with documents that show the real value, in dollars, a golf course brings to a community or region. The NGF introduced such a document in 1992 when it published "The Economic Impact of Golf Course Operations on Local, Regional, and National Economies." Some of its financial assumptions are supported by another NGF publication, "The Golf Course Operations and Maintenance Survey Report," which details, by region and by type, the revenues and expenses associated with operating an 18-hole golf course.

Economic impact studies are complex economic tools that trace the full economic ramifications of a specific business entity, such as a golf course. These studies have traditionally been a favorite tool of govern-

Figure 1 — Climate Regions

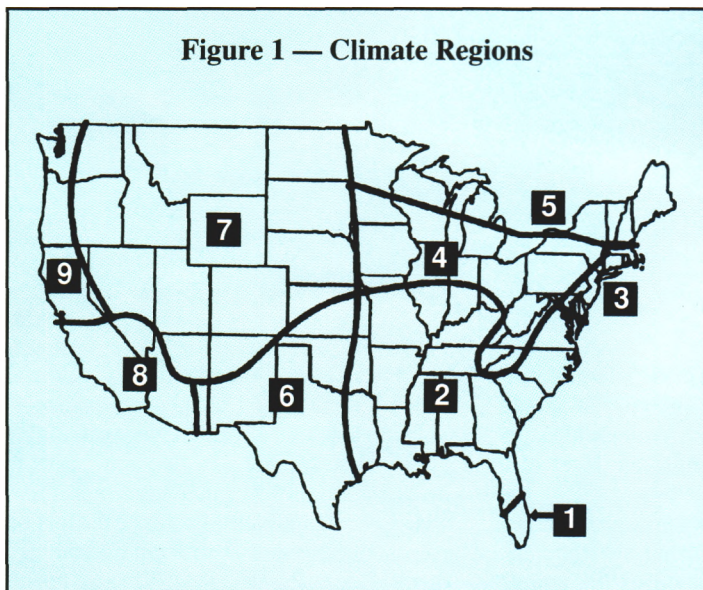
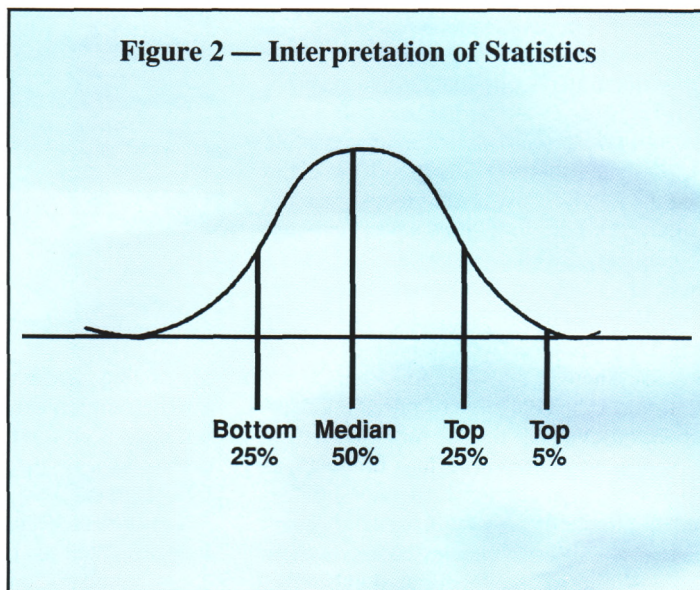


Figure 2 — Interpretation of Statistics



Source: Oklahoma State University's Geography Dept.

ments deciding whether airports should be built or highways improved. More recently, university research teams in Arizona, Texas, and Alabama, as well as the NGF, have applied economic impact studies to the golf industry.

The hope is that, as golf courses receive the credit they deserve for supporting and stimulating local economies, they will be viewed accurately as tax-paying entities that provide jobs and purchase goods and services within the community or region.

This study is organized into three sections:

- What Golf Facilities Mean to the Economy
- Economic Impacts of Typical Golf Facility Operations — Case Studies
- How to Conduct Economic Impact Studies

The publication shows there are several benefits a golf facility brings to a community. Among them: recreational opportunities; golf-related jobs; income to the community through purchases, wages, and taxes; indirect jobs and income; and an increasing community tax base. Additionally, a golf facility can elevate the quality of life, improve the business climate, and induce tourist traffic.

On the national level, the NGF in 1992 hired FXM Associates of Mattapoisett, Massachusetts, to measure the impact of golf on the U.S. economy. Their findings showed that the U.S. golf industry is contributing \$17.4 billion a year in direct and indirect sales and household income. It's also responsible for 370,000 full-time equivalent jobs.

The Golf Course Operations and Maintenance Survey Reports

While NGF's economic impact study is helping facilities clarify their role within the community, its "Golf Course Operations and Maintenance Survey Report" is helping facilities look within their industry and improve their overall efficiency.

The outgrowth of a year-end 1992 survey of more than 1,700 public and private golf facilities, this report gives existing facilities a way to measure their performance relative to others of their type within their region. The publication also facilitates comparisons of operating results and characteristics between regions.

The report also serves to educate lending institutions so that they can more easily determine whether to provide capital for new development, acquisition, and refinancing.

Until the late 1980s, golf course projects frequently were a component of a much larger residential development. This made golf course development capitalization easier because it was piggy-backed on the infrastructure and development capitalization.

With the downturn of the real estate market and the reluctance of banks to capitalize

large-scale residential developments, the golf course asset has had to stand on its own economic merits. In the majority of cases today, a golf course loan must meet stringent "pay-back" requirements.

With the objective of better understanding the operating characteristics and performance of golf facilities, the NGF tabulated the 1,700 completed responses to a survey of 18-hole regulation-length golf facilities. For the sake of consistency, par-3, executive-length, and non-18-hole golf facilities were excluded. The responses and results were separated into three reports, one for each facility type: daily fee, municipal, and private.

Within each report, the findings were cataloged into nine climate regions (Figure 1) that were developed for the NGF by the Geography Department at Oklahoma State University based on similarities in climate, turfgrass types, facility density, and cultural factors. Separating the findings of the study by region is important because such factors as length of season, climate, and availability of water vary greatly across the country and dramatically affect operational revenues and expenses.

To present the data from the survey results, the NGF used percentiles for illustrative purposes (Figure 2). For example, the median or 50th percentile indicates that 50 percent of the responses fall below this amount and 50 percent above.

The reports cover such operating characteristics as gross revenues, revenue distribution, gross expenses, expense distribution, net operating income, average operating margins, average annual capital investment levels, rounds played, green fee levels, cart fee levels, maintained acreage, clubhouse space, maintenance building space, employment distribution by type, real estate and resort affiliation, sources of irrigation water, water consumption, and golf cart fleet size and usage.

To provide a taste for the usefulness of the data, selected operating characteristics are presented below for regions 1, 4, and the U.S. as a whole.

Conclusion

For better or worse, golf courses are increasingly viewed as targets for new taxes, regulations, and laws. In many cases these decisions can be influenced by well-informed golf facility managers and superintendents. These recent NGF publications have proven successful in helping owners, managers, and superintendents to better support their position for equitable treatment. The publications also provide reliable and timely information upon which good business decisions can be made, so as the game grows, every segment of the golf industry can benefit appropriately.

Selected Operating Characteristics — 18-Hole Daily-Fee Golf Facilities

| | Region 1 | | Region 4 | | USA | |
|---|-------------|-------------|-------------|-----------|-------------|-------------|
| | Median | Top 25% | Median | Top 25% | Median | Top 25% |
| Revenues | \$1,249,000 | \$1,739,000 | \$559,000 | \$705,000 | \$732,000 | \$1,218,000 |
| Expenses ¹ | \$866,000 | \$1,287,000 | \$383,000 | \$590,000 | \$520,000 | \$823,000 |
| Rounds Played | 50,000 | 61,000 | 30,000 | 38,000 | 35,000 | 45,000 |
| Weekend Green Fees | \$22 | \$43 | \$16 | \$20 | \$18 | \$25 |
| Total Maintained Acreage | 100 | 134 | 117 | 138 | 117 | 141 |
| Full-Time Maintenance Staffing | 15 | NA | 5 | NA | 8 | NA |
| Full-Time Maintenance Staffing (Seasonal) | 3 | NA | 8 | NA | 5 | NA |
| Sources of Irrigation Water | | | | | | |
| • Lakes & Streams | 58% | NA | 36% | NA | 44% | NA |
| • Potable Water | 0% | NA | 11% | NA | 14% | NA |
| • Effluent Water | 15% | NA | 2% | NA | 10% | NA |
| • Wells | 27% | NA | 48% | NA | 27% | NA |
| • Other | 0% | NA | 3% | NA | 5% | NA |
| Total | 100% | NA | 100% | NA | 100% | NA |

¹Before debt service, depreciation, and taxes

NA means "not applicable"

THE BEST TURF TIPS OF 1994

BLOCKBUSTER AERIFICATION

by **PATRICK M. O'BRIEN**

Director, Southeastern Region, USGA Green Section

VERTI-DRAIN deep-tine aerification is a labor-intensive and disruptive maintenance operation for putting greens. However, a new block attachment for the Verti-Drain aerator may prove helpful in improving the efficiency of this operation so that fewer treatments are needed for even the poorest of soil conditions.

In 1987, the Verti-Drain was introduced into the United States from Holland. Johnny Burns, golf course superintendent at the Charlotte Country Club, Charlotte, N.C., purchased one of the first machines and made a few modifications aimed at improving the original unit. Last spring, the development of his new block attachment allowed for closer tine spacing.

This new block is steel reinforced and attaches to the existing tine holders of the Verti-Drain. Four bolts are used to secure them to the machine. The block allows the golf course superintendent to produce an alternative tine pattern with a 3" x 3" rectangular spacing, compared to the existing irregular pattern of 3" x 4½" with the original tines. This allows for a significant increase in the amount of root zone material that can be extracted during the aerification process.

With the use of a 1½" hollow tine and a normal penetration depth of 10" with the Verti-Drain, approximately 3.4 cubic yards of soil per 1,000 square feet can be extracted with the new attachment. The original block pattern using the same tines and depth penetration will extract 2.3 cubic yards of soil per 1,000 square feet. Based on these figures, about 66% additional root zone material is extracted with the new block attachment! On a 5,000-square-foot green, it is possible to extract up to 10% of the root zone material using this procedure, compared to 6% without the attachment.

It does take significantly more time and labor to aerify greens using this method. At Charlotte Country Club, using the original tines normally took the aerification crew 18 hours to complete their work, but using the new blocks doubled the time to 36 hours. By using a dry topdressing sand, the majority of the aerification holes were filled by working the sand into the holes with a Yankee lute



The steel block attaches to the existing tine holders of the Verti-Drain.

rake. With the increased number of holes made during the project, it took the bentgrass approximately three weeks to fully recover during pleasant spring weather.

The new block attachment has helped the Charlotte Country Club become more efficient with their Verti-Drain program. The membership has agreed to try this new pro-

gram for the next four to five years in the hope that it will delay the necessity for a green reconstruction project. For older golf courses with less than ideal soil conditions, using this idea to reduce the number of Verti-Drain treatments and to make more of an impact on changing the soil profile is worthy of consideration.

Getting the Word Out

by JOHN H. FOY

Director, State of Florida, USGA Green Section

"What we have here is a failure to communicate."
Cool Hand Luke, 1967

WHILE THAT classic movie line is over 25 years old, poor communication is still a major problem in golf course management today. A couple of years ago, Bob Brame, USGA Green Section agronomist in the Mid-Atlantic Region, surveyed the staff and found that communications/public relations was the number-one pitfall of golf course maintenance.

So how does one achieve effective communication? We all have seen different strategies used, ranging from one-on-one discussions to group presentations, as well as club newsletter articles and course information boards. My turf tip for this year involves a communication method that has worked very well at a couple of courses in the Jacksonville, Florida, area.

Eddie Snipes, CGCS at the Oak Bridge Club at Sawgrass, in Ponte Vedra Beach,

Florida, realized that despite his efforts, the majority of golfers were not aware of what was happening on the course. Out of frustration, he began putting out weekly one-page course communication sheets. Based on the success that occurred at Oak Bridge, Bob Flanagan, CGCS at Jacksonville Golf and Country Club, in Jacksonville, Florida, also began putting out similar communication sheets.

These course communication sheets contain information on activities accomplished that week, as well as upcoming practices or programs to be aware of and updates on recent environmental conditions.

For example, at Oak Bridge, during the week of February 22-26, 1993:

- 1.88 inches of rain occurred.
- A fertilizer plus pre-emergent was applied to the roughs.
- The greens were groomed.
- New mulch was added to landscape beds around the clubhouse.

- Junipers were planted around the parking area.

It was also noted that a representative with Rhone-Poulenc would again be conducting mole cricket research on the golf course.

At Jacksonville Golf and Country Club, for the week of October 25-29, 1993:

- Cordgrass was planted on the 16th tee lake bank.
- Fairways 13, 14, 16, and 18 were overseeded.
- A sod webworm spot treatment control was conducted.
- 7.1 inches of rain occurred between the 24th and 26th.

A short paragraph on the mowing of the recently overseeded greens and what to expect for the next two to four weeks was included with this weekly report.

When disruptive or inconvenient operations are scheduled, "special alert" communication sheets are put out the week prior. At Oak Bridge, before course aerification was initiated on February 15th, a special alert was published that described the method of cultivation along with the benefits of this practice. Mr. Snipes pointed out that when references such as turf management books were cited, acceptance increased.

From start to finish, about one hour a week is required to produce these course communication sheets. After writing up the information in a bullet item format, one of the club's secretaries does a layout on a computer with a word processing program, such as WordPerfect. A couple hundred copies are then produced and placed on the pro shop counter, on a sign board at the first tee, in the locker rooms, and at the snack bar.

Also at Oak Bridge, the weekly communication sheets are saved for later use. For each meeting of the green and golf committees, copies are given out. This has proven to be a popular method for reviewing and planning course management activities.

Although you may not have access to a computer and a laser printer to produce the "slick" course communication sheets being used by Messrs. Snipes and Flanagan, a typewriter and a photocopying machine can be used just as effectively. Devoting a little bit of time each week to "getting the word out" can make all the difference in the world as far as maintaining good communications and successful course management is concerned.

At the Oak Bridge Club at Sawgrass, course communication sheets are posted on the information board at the first tee, in the locker rooms, and in the snack bar.



Covering Up For Winter

by JIM SKORULSKI

Agronomist, Northeastern Region, USGA Green Section



An 8-12" layer of straw placed above a permeable geotextile cover is used successfully at Mt. Bruno Country Club. Many golf course superintendents cover the straw layer with an impermeable cover for added protection.

IT IS NOT UNUSUAL to hear a superintendent utter during times of summer desperation, "If I only took that job in the North; anybody can grow grass up there." Well, I have come to learn that there is no region that does not offer stiff challenges to the turf manager. Granted, the challenges will take on different forms, but all can be equally taxing to one's mental stability. Crown hydration injury is one of those challenges facing superintendents in the North. Mention of the problem will make even the strongest northerners shudder in their insulated boots. Crown hydration injury is a form of ice damage that is most severe on *Poa annua*. Severely damaged greens are often unplayable until the recovery is well advanced in late spring or early summer.

The damage is thought to occur during freeze/thaw cycles when the plant becomes hydrated and then is subjected to a severe drop in temperature. The water within the

plant freezes and expands, causing physical damage to the cells. Damaged plants appear water-soaked and will often remain necrotic in spring. Ice-related injury has been severe throughout central and eastern Canada and the northern United States, where winter temperatures fluctuate widely. Ice is more likely to occur on shaded greens and areas where surface drainage is poor. Turf that has not hardened properly prior to becoming dormant is also more prone to this type of injury.

Attempts are made to mechanically remove ice and heavy snow to prevent the injury. Areas of poor surface drainage are also trenched to prevent water from puddling on the surface. These efforts can be effective; however, where labor is limited during the winter months, they may not be practical.

Superintendents also employ various covering techniques to prevent crown hydration injury from ice. Impermeable plastic

covers are popular in the Toronto area. Superintendents in the Montreal region use a different covering technique that was originally developed by Doug Meyer, superintendent at Cedarbrook Golf and Country Club. The technique utilizes geotextile covers and an insulating straw layer to minimize large temperature fluctuations and prevent plant hydration. Rick Brown and Marc DuFresne, superintendents at Mount Bruno Country Club and Beaconsfield Golf Club, respectively, have employed this covering technique, and their programs will serve as the basis for this turf tip.

The process begins in mid- to late fall, as the turf enters dormancy, with a fungicide application to prevent snow mold diseases. The covers and straw can create an ideal disease environment, so fungicide protection is important. It also is recommended to apply a rodent repellent prior to spreading the straw to prevent damage from tunneling activities beneath the covers. After the fungicides have been applied, a geotextile cover is placed over the green to ease straw removal in spring. The straw layer is installed after the cover is secured in place. A 12" layer of quality oat straw was used initially for the insulating layer. This has been reduced by both Mr. Brown and Mr. DuFresne to approximately 6-8" to reduce material costs. The 6-8" layer required 10-12 bales of straw per 1,000 square feet. The straw is often spread manually, although attempts have also been made to spread the straw with leaf blowers, mulching machines and other devices to speed the process. Large, round bales are also being used at several golf courses to help make the application easier.

After the straw has been spread, a final impermeable cover is generally installed. A popular cover for this step is the Evergreen Ice Shield. The cover keeps the straw in place and prevents it from becoming wet. Mr. Brown had success last season without the final cover over the straw layer and has chosen to omit it again this year. If the outer cover is used, it must be secured soundly around the perimeter. Mr. DuFresne purchases covers that are custom-made with

USGA

responds
to heightened
environmental
awareness



Concerns about the environment are influencing the management of existing golf courses, as well as the development of new courses. The USGA budgeted more than \$3.2 million over three years to fund 21 research projects investigating how turfgrass management impacts the environment.

Research objectives included: understanding turfgrass pest management and fertilization effects on water quality and the environment; evaluating valid alternative methods of pest control for integrated turf management systems; determining the human, biological and environmental factors that golf courses influence.

This research investment already has yielded two important publications. The *Landscape Restoration Handbook* by Donald Harker offers information to property owners and managers about naturalizing the managed landscape. *Golf Course Management and Construction: Environmental Issues* by Drs. James Balough and William Walker provides a comprehensive summary of the effects of construction and management of turfgrass systems.

Results from many of the projects were presented to the USGA Turfgrass and Environmental Research Committee in April. The findings are being reviewed and evaluated to determine what topics require additional research. The next step is to summarize the information and share it with you and others. These research results lay a solid foundation for further turf environmental research. They also provide a better understanding of how golf courses can properly select and apply products to minimize their effects on the environment.



TRAINING AND COMMUNICATIONS PROGRAM ADDRESSES CRITICAL ISSUES

Golfer and non-golfer concerns generally fall into four areas: use of scarce water resources, pollution of water resources, loss of natural areas and the effects of golf courses on people and wildlife.

Completing the initial research projects is just the first step in the process of addressing the impact of golf on the environment. Under the theme, *Preserving Golf and the Environment*, the USGA is launching an extensive educational and communications program to share research results with a variety of groups including superintendents, golf officials, regulatory agency scientists, allied associations, municipalities, environmental groups and the general public.

Over the past several months the USGA has gathered input from more than 200 individuals throughout the golf industry, from superintendents to reporters to golfers to environmentalists. The purpose of this discussion was to verify the critical issues and identify ways the USGA can address them.

Based on this input the program will address five major topic areas:

- Benefits of golf to the environment
- Golf and water quality
- Golf and water use
- Golf and human health
- Golf and wildlife ecology

USGA regional agronomists will be sharing information with you, including detailed synopses of the environmental research projects and the implications research results have for your day-to-day

management practices.

The USGA also is establishing a Fact File that will include several levels of information. This file will be organized by topic area and will include a range of information from simple facts to technical research. This file will be created over the next several months, and you'll be hearing more about the information that will be available and how to access it.

This fall, materials will be available for your golf course to help golfers understand some of the key research results and the benefits of golf to the environment.

ONGOING COMMITMENT GENERATES RESULTS

Although the USGA has devoted intensive research funding to environmental studies over the past three years, the organization's commitment to turfgrass research dates back nearly 75 years. In fact, other USGA Green Section activities have strong links to the environmental studies just being released. Ongoing turfgrass research is focusing on development of new varieties that require fewer inputs such as water, pesticides and fertilizer.

The Audubon Cooperative Sanctuary Program for Golf Courses is another excellent example of USGA efforts to encourage responsible management practices that will help to preserve golf and the environment.

More than 1,100 golf courses across the country are already participating in the program.

USGA SUPPORTS 21 ENVIRONMENTAL PROJECTS

PESTICIDE & NUTRIENT FATE

- **Cornell University**—Mass Balance Assessment of Pesticides and Nutrients Applied to Golf Turf
- **Michigan State University**—Groundwater Contamination Potential of Pesticides and Fertilizers Used on the Golf Course
- **University of California, Riverside**—The Fate of Pesticides and Fertilizers in a Turfgrass Environment
- **University of Nebraska & Iowa State University**—Pesticide and Fertilizer Fate in Turfgrasses Managed Under Golf Course Conditions in the Midwestern Region
- **Washington State University**—Quantification and Fate of Nitrogen from Amended and Trafficked Sand Putting Green/Tee Profiles
- **University of Nevada, Reno**—The Effect of Salinity on Nitrate Leaching from Turfgrass
- **Pennsylvania State University**—Mass Balance Assessment of Pesticides and Nutrients Applied to Golf Turf (Runoff Segment)
- **University of Massachusetts**—Mass Balance Assessment of Pesticides and Nutrients Applied to Golf Turf (Volatilization and Dislodgeable Residues)
- **University of Florida**—Mobility and Persistence of Turfgrass Pesticides in a USGA Green
- **University of Georgia**—Evaluation of the Potential Movement of Pesticides Following Application to a Golf Course

ALTERNATIVE PEST MANAGEMENT

- **University of California, Riverside**—Investigation of Turf Disease Decline for Potential Development of Biological Control Methods
- **University of Florida-IFAS**—Pathogenicity and Biological Control of *Gaeumannomyces*-like Fungi
- **Cornell University**—Microbial Basis of Disease Suppression in Compost Applied to Golf Course Turf
- **Iowa State University**—Potential for Physiological Management of Symptom Expression by Turfgrass Infected by *Bipolaris sorokiniana*
- **USDA, Rutgers University, University of California**—Biological Control of Golf Course Turf Pests: Isolation and Evaluation of Nematode and Bacterial Pathogens
- **University of Kentucky**—Damage Thresholds, Risk Assessment, and Environmentally Compatible Management Tactics for White Grub Pests of Turfgrass

GOLF COURSE BENEFITS

- **Texas A&M University**—Quantification and Validation of the Beneficial Contributions of Golf Course Turfgrasses
- **The Earth Fund**—*Landscape Restoration Handbook*
- **The Institute of Wildlife and Environmental Toxicology, Clemson University**—The Effects of Golf Course Activities on Wildlife
- **Texas A&M University**—Human Benefits of Golf Course Views: Emotional Well-Being, Stress and Performance

OVERALL RESEARCH QUALITY ASSURANCE

- **Dr. Bill Walker**—Quality Assurance/Quality Control

grommets fastened along the cover's edge at 24" intervals. Large 12"-long spikes are fastened through the grommets and the covers, which are left in place through winter.

Removing the covers and the straw is the most labor-intensive aspect of the operation. Nearly 600 hours of labor were required last season to remove and dispose of the straw at Mt. Bruno Country Club. The covers and straw are removed in late winter or very early spring. The straw can be pushed off the green manually or with a small tractor equipped with a straight blade. The turf may be chlorotic initially, but it soon recovers after exposure to the sun. The straw debris is stockpiled in an adjacent rough or greenside bunker, where it can be removed at a later date.

As with any covering technique, care must be taken to avoid scalping injury and possible frost damage to the succulent turf after the covers are removed. Therefore it is important to keep the permeable covers at hand so they can be reinstalled if necessary. A fungicide application also is highly recommended immediately following the removal of the covers to extend protection against snow mold diseases.

The primary disadvantages with the straw covering system include labor and material costs, and possible disease injury. Costs for this technique range from \$18,000 to \$19,000. The cost of covering 19 greens at Mt. Bruno Country Club was approximately \$19,000 (not including covers), but the costs will probably lower as application and re-

moval techniques are refined. Ask Mr. Brown or Mr. DuFresne if the covering technique is worth it, and their answer is a resounding "Yes." The greens are playable four to six weeks earlier in spring, and the turf is stronger for the upcoming season.

Is this covering technique for you? That is a decision only you and your course officials can make. Ideally, problems of inadequate surface and internal drainage and poor growing environments should be addressed to provide a long-term solution to the ice problem. However, the straw cover technique provides a viable option, especially for those few problem greens prone to crown hydration injury. The technique's costs will quickly be forgotten when golfers can better enjoy greens free of winter injury.

HAVE AN "ICE" DAY

by **ROBERT C. VAVREK, JR.**

Agronomist, Great Lakes Region, USGA Green Section

WINTERKILL of turf in low-lying, poorly drained areas of the golf course is an annual concern of many superintendents located in the northern tier of states and Canada. Crown hydration is considered to cause the most serious losses of turf, but the injury that occurs under prolonged periods of ice cover and, to a lesser extent, wind desiccation, can also cause significant damage.

Ensuring adequate surface drainage is one good defense against crown hydration and ice injury. Eliminate or minimize water-holding hollows/swales on the golf course and there simply is little potential for standing water to cause problems during the winter. The time to design an appropriate amount of drainage into the course is during construction. Once the course is in play, altering surface drainage patterns involves a considerable amount of inconvenience to golfers. The installation of subsurface drain tile, sumps, and surface drains will facilitate the rapid removal of excess water from the course during spring through fall, but subsurface drainage is practically useless when the ground is frozen.

Even where adequate surface drainage exists, the right combination of weather conditions during winter can turn portions of

the golf course, especially greens, into ice skating rinks. Just how long cool-season turf can survive under ice cover is not well understood. Very little research has been undertaken regarding ice damage, and the most widely accepted study, by Dr. James B. Beard, was done almost 30 years ago (Beard, J. B. 1969. Winter Injury of Turfgrasses. Proc. 1st Inter. Turf. Res. Conf. 1:226-234). He concluded that turf can survive under ice for 50 to 60 days and that *Poa annua* will be the first species to winter-kill. Recent research by Dr. John Roberts at the University of New Hampshire suggests that the length of time turf can survive under ice can vary significantly, depending on the quality of ice (clear or cloudy), the presence of snow cover, the physiological condition of the turf just before freezing, and many other factors.

Enough of theories. Let's say that several of your greens have been covered with 6-8" of ice for about two months with no thaw in sight. What are the options for ice removal? Some superintendents have spread "darkening agents" such as Milorganite, charcoal, soot, or other materials over greens to collect the heat from sunlight and melt the ice. The results range from complete success to little effect. Obviously, darkening agents depend

upon sunlight, something that can be in very short supply during winter in many parts of the country.

Physical removal of snow and ice from greens has been attempted at many courses with varying degrees of success. The following "recipe" for ice removal comes courtesy of Randy Witt, CGCS, of the Oneida Golf and Riding Club, Green Bay, Wisconsin. He has fine-tuned a technique for eliminating thick ice from greens through trial and error. He utilizes a Ryan GA-30 aerator and a Turf Cat 72-inch rotary mower equipped with a sweeper.

First of all, *use common sense*. Operating any equipment on a slick, ice-covered green can be risky, especially on a severely contoured putting surface. This technique is best suited for relatively flat greens. The GA-30 travels forward on ice surprisingly well, but it is nearly impossible to operate in reverse, so plan your pattern of travel across the green accordingly. Mr. Witt uses homemade, blunt-tip, 3/8-inch-diameter solid tines on thick ice cover. The tines are cut from a length of 3/8-inch rolled steel rod. Standard 1/2-inch-diameter solid tines have relatively sharp points and are used after most of the ice has been removed or on thin ice covers. The smaller, sharper tines are used to minimize



(Above) A Ryan GA-30 aerator equipped with $\frac{1}{2}$ "- or $\frac{5}{8}$ "-diameter solid tines is used to carefully remove thick ice cover from the putting surface.

(Right) When the depth of penetration is set to about $\frac{1}{2}$ ", the tines cleanly shatter the ice. When set deeper, substantial damage to the tines, tine holders, and aerator will occur.



damage to the frozen putting surface and the geotextile fabric covers that are used to protect the greens from wind desiccation.

The key to success is to be patient and not become greedy. It's cold, but trying to remove an inch or two of ice with each pass of the aerator will only result in broken tines/tine-holders and serious damage to the equipment. Adjust the depth of penetration to *remove not more than $\frac{1}{2}$ inch of ice at a time*; then make multiple passes at right angles to the previous pass until the ice is

shattered. The first pass or two may only dimple the surface, but subsequent passes will have greater effect. The sweeper is used to remove loose ice after every few passes. It can also be used to remove snow cover before ice removal, if necessary.

Another tip is to remove ice during the colder early morning hours. The ice is brittle and more easily shattered at low temperatures. By mid-morning on a sunny day, the surface ice may be too soft for this technique.

In summary, it may not always be necessary or advisable to remove ice from greens. Many factors must be considered: how long the ice has been present, the potential for wind desiccation if the ice is removed, the condition of the turf during ice formation, the percentage of *Poa annua*, etc. Once the decision is made to remove ice, though, careful use of an aerator can produce excellent results if patience and common sense are used. The key to success — only remove a little ice with any one pass of the equipment.

SAND BUNKERS: *Old and New*

by JOSEPH G. BAIDY

CGCS, President, Golf Course Superintendents Association of America

THE IMPRESSION a golfer receives of a golf course is a composite picture based on individual perceptions. Negative features of the course will greatly influence golfers' opinions, regardless of favorable conditions they may experience. That is just the way of golfers — they are the most critical individuals in any sport.

Among the factors that most strongly influence a golfer's impression of a course are the sand bunkers and their condition. Bunkers play a strategic role and also have a profound influence on the overall character and design of a course. To have your shot land in a bunker would be a satisfying experience if it's intentional, but in most cases, it's just plain bad luck.

Ideally, a golfer should consider playing from a bunker as just another challenge encountered during a round. If the sand bunker is in good condition and maintained properly, the golfer will accept a poorly executed shot as his fault. But, let the sand be wet, puddled, or of inconsistent uniformity throughout the course, and any other bunker shot played during the round may create anxiety. This feeling can cause the golfer to view the course negatively.

The age of a golf course has a direct bearing on the condition of the bunkers. Clearly, there comes a time when renovation is called for. When that time arrives, a bunker renovation program should be built into the club's annual operating or capital budget. The addition of sand annually, in my opinion, is not renovation, and it does not represent adequate bunker maintenance in most instances. The only exception I know about is a golf club that has used the same sand for over 20 years; they use plastic between the sand and soil, and they have been very successful.

Regular bunker maintenance should not, however, be limited to the sand alone. One also must consider drainage and surrounding turf areas, mainly the slopes that are facing the greens, as part of the maintenance program.

At this point I would like to focus on the conditions that can develop with old bunkers. As previously noted, maintaining grass slopes is a critical part of bunker maintenance, and bunker edges can shift constantly, depending on grass types, wind conditions,



PHOTO COURTESY GCSAA

Joseph G. Baidy

and traffic. Edging a bunker incorrectly can be a real problem in terms of losing its original shape and size, depending on the amount of material removed. With sand constantly being blasted onto the slopes, this area can become unstable, and unless sand deposits are constantly removed, the turf can become thin and sparse, eventually resulting in the complete loss of grass on the slopes. This could alter the architect's original design concept for the course. I've seen bunkers shift forward five to 10 feet, and sometimes even greater distances, compared to when the course was originally built.

Steep slopes can present still more problems. Sand washes off the slopes during rainstorms, exposing soil that then contaminates the remaining sand in the bunkers. Silt can then gradually infiltrate into the drainage system, thus creating future drainage problems, and the sand/soil mixture produces a surface inconsistent with the other bunkers throughout the course. The sand/soil mixture eventually becomes dusty, and a hardpan situation can develop.

Sometimes drainage systems also cease to function due to silt accumulation. Instant new ponds will be formed where sand bunkers once reigned. Some golfers find it

difficult to interpret the Rules of Golf concerning drop areas, and this can often lead to disagreement. Shoveling sand back in place is both labor intensive and time intensive. Pumping water from bunkers requires equipment, time, and manpower. Adding new sand to the bunker is a waste of money because the next rainstorm probably will produce the same results.

Renovation is the only answer for golf courses suffering through these conditions. The bunkers at Acacia Country Club, over a period of time, suffered the same fate as those just mentioned. Our problem was compounded during the last six years by some of the wettest years ever recorded, alternating with years when drought-like conditions were prevalent. The club then decided to renovate the bunkers.

Since the course was designed in 1921 by the distinguished architect Donald Ross, a return to this style of bunker weighed heavily on the committee. Due to economics, it was decided to carry out the renovation in-house over a four-year period. One advantage of this type of approach was that the club was able to restore the bunkers as closely as possible to the original design without being hindered by any major time constraints. Research of old photos, maps, and members' memories helped guide the renovation process.

Consideration also was given to allow for minimum interruption of play and even to cease work during major club functions. We were able to work on drainage as part of the bunker renovation at the same time. I consider drainage a major component for any successful bunker renovation program. We went to the areas that have a good outlet as well; you have to get water out of that bunker and you may have to go anywhere from 100 to 300 yards, or whatever it might take, to remove the excess moisture and make the bunker playable as quickly after rainfall as possible.

Recognize that there are many disadvantages to building in-house. For example, the golf course was constantly under construction, and the golfers experienced radical extremes in sand playability from renovated bunkers to untouched bunkers. Scheduling of equipment used for other course projects was difficult, and the project with the great

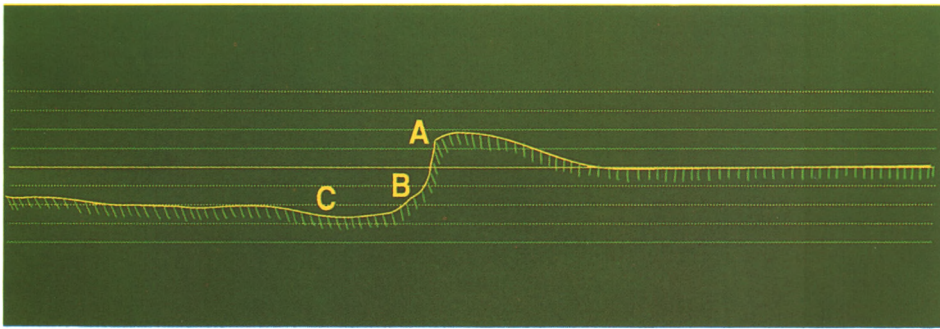


Figure 1

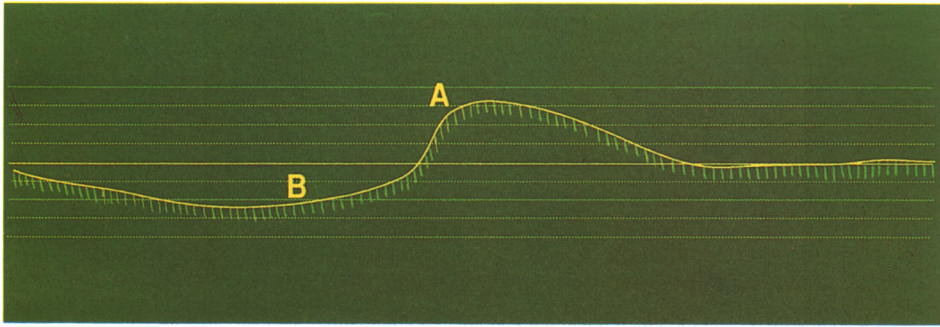


Figure 2

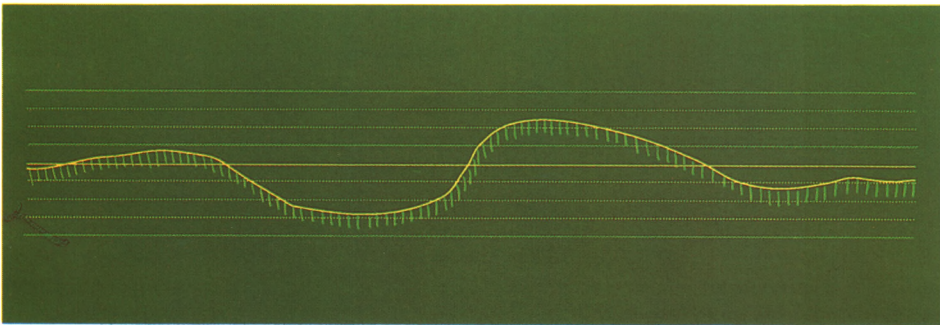


Figure 3

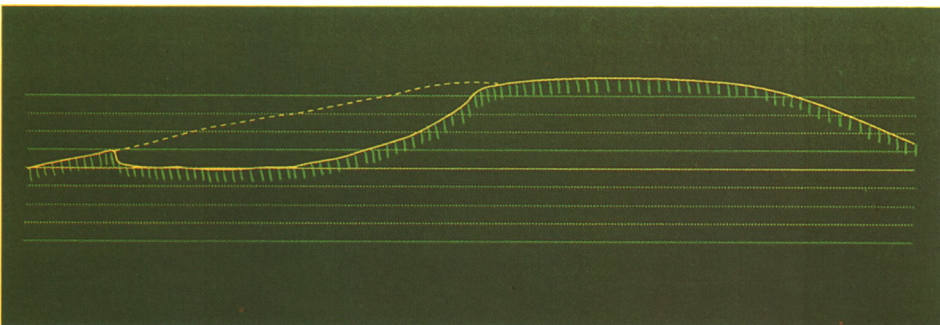


Figure 4

Donald Ross created various mounds and bunkers. Figure 1 depicts a typical bunker face less than 3 feet deep, with a steep slope from A to B and a gradual slope from B to C. Figure 2 is a typical bunker greater than 3 feet deep with a gradual grade from A to B. A depressed bunker with the face raised above the surface is demonstrated in Figure 3. Figure 4 shows a bunker dished out of the face of a mound with a sand face.

est priority was always the winner. Of course, we must not forget the constant training of staff to meet the club's objective. With the positives outweighing the negatives in terms of the work's final outcome, the golf course staff was eager to get started.

First of all, an understanding of the various types of mounds and bunkers that Donald

Ross created is important. Figure #1 shows a typical face for a bunker less than three feet from the top of the bunker greenside, half-way down the slope. The slope is very steep as shown from point A to B. The remainder of the slope leading to the sand portion is a gradual grade and is noted as B to C. Figure #2 shows a typical face for a bunker more

than three feet. This one has a gradual slope from the top of the bunker from the greenside to the sand portion. Figure #3 depicts a bunker that is depressed with the face raised above the surface. Figure #4 shows a type of bunker dished out of the face of a mound with a sand face.

After carefully studying and reviewing the bunkers throughout the course, it was time to commence renovation. The green committee decided to grass all slopes so that all bunkers would have flat surfaces. At the outset, the face of the greenside slopes had to be removed along with the remaining sand.

Studies and determination of original bunker shapes were made. Sometimes we were lucky to find an original outline of a bunker from remaining ground contours. Another way of finding original bunker shapes was from leftover sand deposits. On some of our bunkers, the tile line provided an indication of where the bunker was originally located, along with the photographs in the clubhouse.

We did not have any plans or drawings for Acacia Country Club, so we went out and did it the hard way — we probed. We tried to find everything possible, from identifying ground contours to talking to everyone who had been at the club for a long time. We were lucky in some instances to find original sand. On the eighth hole, the original sand gave us a complete outline of the whole original bunker. It was completely different from the way it had been remodeled before. The bunker on the back of the 18th green was under five feet of soil that had been brought in to provide a more level playing area, but we located the original sand deposits with the drain tile lines.

The drainage tile system in the bunkers was completely replaced and improved. I might add that the materials surrounding the old plate tile consisted of a cinder-like substance. When removed, it was used to fill the potholes in the maintenance road. This material set up just like asphalt due to the silt accumulation over many years.

After determining the percent slope, depth, and contour of the bunker, the area was staked for visual confirmation of the exact size and location. We drew an outline of the staking pattern, where the flat part of the bunker was going to be, and the area to be grassed in. We made certain that staking was done in such a way that the operator knew what areas to go into, and that we would end up with bunkers conforming to the shape and size we had calculated.

Soil with a high-clay content was used to develop the slopes; we did not want any erosion. This was tamped in place to prevent erosion and to help stabilize the steep slopes. Once the banks were roughed in, an outline

of the bunker was established. Over the years I had used burlap bags filled with soil or strips of plywood staked in position to form bunker outlines. With plywood, the bunkers were out of play until the sod rooted to a sufficient depth and the banks were stabilized. But by using four-inch plastic tile for establishing the bunker edge, once the sod rooted, generally within 10 days, the bunkers were open for play.

Another reason to use the tile method is that when a shot is played near the bunker edge, the normal follow-through that strikes the edge would be soft and safe, unlike that of wood. To further soften the blow, the plastic is covered with sod. When we lay sod, we put it right over the plastic tile. Take it right into the bunker itself and then sand it the same way. This can be left in place for months until satisfactory root depth is achieved. After the needed time, the plastic tile is removed and the edges are trimmed. The bunker is then totally renovated. Using four-inch plastic tile also makes it easy to maintain a four-inch sand depth throughout the bunker, and the plastic tile can be reused in other bunkers. It is best to use unperforated tile instead of the perforated type. The next step is to review the drainage system and determine the additional needed tile lines.

Our golf course is now more in tune with the original design that Donald Ross envisioned, and Acacia golfers now have a fresh opportunity to appreciate that vision.



During the Acacia Country Club bunker renovation, drainage pipe was used to delineate the renovated bunker edge.

THE BEST TURF TIPS OF 1994

No More Rolling Stones

by **DAVID A. OATIS**

Director, Northeastern Region, USGA Green Section

IT IS NO SECRET that good drainage is a requisite for growing healthy turf on a consistent basis. Regardless of the golf course superintendent's abilities, problems are likely to be experienced if adequate drainage does not exist. Playability suffers, aesthetics suffer, and stress and disease problems are much more common with poorly drained soils. Having said all this, it is clear that most courses have at least a few drainage problems. This can be due to a variety of factors, such as the design or

topography of a golf hole or the poor internal drainage qualities of the existing soils, possibly aggravated by compaction.

Regardless of the reasons for poor drainage, installing effective drain lines isn't all that complicated. We can use high-tech tools like laser grading devices, a common land level, or low-tech tools such as a poor man's level consisting of clear tubing attached to a graduated measuring device. Positive and steady fall of 1% or greater is necessary between the drain's inlet and the outlet. The

inlet obviously must be located below the area in need of drainage, and the outlet must not be restricted.

Despite the simplicity of the concept, ineffective drainage systems are fairly common. In some cases, the drainage pipe may not be sufficiently large enough to handle the volume, or it may have been installed improperly without adequate fall, making it non-functional. Tree roots can also cause problems with drain lines, but sometimes the drains are simply not put in the right



Open stone drains are effective, but dislodged stones are a nuisance.



Gutter Guard holds stones in place and encourages the grass to grow over more quickly.

locations. There is also the rare occurrence when a drain line actually works too well and creates a droughty situation in the turf immediately over the pipe.

Unfortunately, my turf tip won't cure any of these problems. It cannot insure that a drain line is installed in the right location, it cannot insure that it is installed with adequate and even fall, and it cannot keep tree roots out. However, if you choose to install open stone drains, this turf tip can improve the appearance and the effectiveness of your finished product. It comes from Al Rathjens, golf course superintendent at Raritan Valley Country Club in Somerville, New Jersey. Al has been the superintendent at Raritan Valley for 27 years, and over the course of his tenure

he has installed nearly six miles of drain lines. Al began using open stone drains many years ago and experienced a common problem of stones being dislodged from the trenches by golf carts and mowing equipment. Even more problems were experienced with water washing stones out of the trenches when they were installed on sloped areas. Although open stone drains can be quite effective, the stones that are dislodged are a nuisance and can present a hazard to mowing equipment and even to golfers themselves. It only takes one stone to ruin an expensive bedknife or reel.

To combat the problem, Al devised a very simple and cost-effective strategy; hence, my turf tip "No More Rolling Stones." Al's

simple but effective solution was to use Gutter Guard, which is 6" wide and available in 25' rolls from most hardware stores. The material is placed carefully over the gravel in 4" or 6" trenches. It is then held in place by long aluminum gutter nails and/or turf blanket staples inserted through the mesh and into the sides of the trenches. The Gutter Guard material is available both in plastic and aluminum, and it neatly holds the stone in place and encourages the grass to cover more rapidly by providing additional points of attachment.

So, if you are considering the installation of open stone drains but are concerned about stones washing or becoming dislodged, try this tip and eliminate your rolling stones.

Low-Cost Comfort at Deadwood

by JAMES M. LATHAM

Director, Great Lakes Region, USGA Green Section



This well-designed, low-cost restroom facility gets its water supply from the irrigation system around a nearby green. The skylights provide adequate interior illumination.

RESTROOM facilities on golf courses range from the ridiculous to the sublime and may even be missing on some nine-hole layouts. The portable plastic models serve their purpose but leave much to be desired as a permanent fixture. Servicing these cubicles can also be a problem in remote locations or in areas without hard-surface roads.

Golf course superintendent John Schultz, at Tomahawk Lake Country Club near Deadwood, South Dakota, saw the need for improvement and designed a low-cost sanitary restroom facility near the fourth green.

The exterior is wooden, log veneer with skylights in the roof for illumination so that electricity would not be required. The water supply for flushing the toilets comes from the irrigation piping around the green, after reducing the operating pressure to 20 PSI.

Each of the two restrooms is fitted with a standard flushing toilet. Lavatories were not installed, since untreated water is used for irrigation and water from faucets might invite drinking it. Wastewater flows into a standard septic tank and drain field with an appropriate permit.

The cost of this facility was less than \$4,000. Detailed expenditures follow:

The Building

| | |
|--------------------------|------------|
| Concrete Pad | \$ 171.60 |
| Building Materials | 1,484.48 |
| Carpenters | 450.00 |
| Plumbing & Fixtures | 620.97 |
| Square Skylights (22.5") | 142.00 |
| Vents | 15.50 |
| Lockable Metal Doors | 350.00 |
| Total | \$3,234.55 |

The Septic System

| | |
|------------------------|-----------|
| Backhoe Work | \$ 80.00 |
| Gravel | 170.00 |
| Septic Tank (500 gal.) | 85.00 |
| 2 ft. Extension | 18.00 |
| Delivery Charge | 37.50 |
| Total | \$ 390.50 |

Worked Performed by Staff

Installed Septic Tank and Drain Field
Built Forms and Laid Concrete
Stained and Painted Wood

The result is a low-cost, functional restroom with a rustic appearance that fits this delightful golf course and the general motif of the Deadwood area.

A Method of Recycling: From Clippings to Compost

by R. A. (BOB) BRAME

Agronomist, Mid-Atlantic Region, USGA Green Section

AS THE WORLD'S POPULATION continues to grow, it is clear that managing our natural resources is vitally important to future generations. All of us, for example, are becoming more aware of the value and importance of recycling. And while items like aluminum cans, glass bottles, and newspaper often draw our attention, there are other resources that can be recycled. This turf tip deals with "A Method of Recycling" developed at Belmont Country Club in Toledo, Ohio. It is focused on the recycling of grass clippings, taking them from an expensive waste material to a beneficial compost.

The removal and disposal of grass clippings can be time consuming, expensive, and can result in the loss of a valuable natural resource. This is particularly true when clippings are collected and removed in a fairway maintenance program.

Some maintenance operations scatter clippings in the adjacent rough, but this can

cause problems with aesthetics, odor, and/or playability, especially when continued over time. Other courses pile clippings for removal or throw them directly into trailers. If clippings are hauled away, where do you take them — to a remote spot on the property or a community dump? Some golf course operations are throwing clippings into dumpsters for removal. However, this is expensive and, in some cases, no longer an option.

When clippings are scattered or hauled away, potential compost value is lost. How can a golf course superintendent catch and remove clippings economically, while still recycling the valuable portion?

Jim Burnard, superintendent at Belmont Country Club, has dedicated two areas of the golf course property to clipping composting and storage. He has found that between one-quarter and one-half acre is needed at each site. One larger site would also be a possibility. As the clippings are removed from the

course, they are deposited into trailers and then transported to the composting site. A temporary pile is made, which later is loaded into a spreader.

A modified manure spreader is used to spread the clippings. The beaters on the spreader have been removed and the height of the chain bar increased. This ensures good movement of the clippings from the hopper during the spreading process. It is important to scatter the clippings in a thin layer to achieve quick drying and to prevent odor. To speed clipping drying and minimize odor, lime is added to the hopper before the spreading process begins. Approximately 25 pounds of lime per spreader load has proven sufficient.

The clippings are spread in a large circular path around the dedicated site. Several clipping circles are created. These paths are located far enough apart to prevent the tractor and spreader tires from tracking through the clippings as they are drying. A path is not reused until the base layer is completely dry. This process is continued throughout the season. Odor has not been a problem as long as the clippings are allowed to dry before more are added on top. At the end of the season, all of the dried clippings are pushed into one large pile using a front-end loader. The large piles of clippings can then be mixed with leaves and other organic debris. It is also possible to add soil or sand to the compost pile. The end result is compost that can be used for any number of purposes from flower and ornamental beds to divot filling and even topdressing areas on the course.

The key to this turf tip is to dedicate one or more areas where the dropping, spreading, and composting of clippings can occur. In addition, a manure spreader must be obtained and modified to handle the clippings. The cost is minimal, and although there is an ongoing time investment, the end result can be beneficial to the entire operation. Why pay to haul clippings away (if still allowed in your area) when, with a little work, they can be recycled into useable compost? This method of recycling is working for Belmont Country Club, and it can also work for you. Give it a try.

A modified manure spreader is used at Belmont Country Club in Toledo, Ohio, to recycle their grass clippings. This method of recycling was put together by Jim Burnard, superintendent (right); Dino Brownson, past green chairman (center); and Dr. George Black, past green committee member (left).



Cupit's Narrows

by LARRY GILHULY

Director, Western Region, USGA Green Section

WHAT IS the first thing that comes to mind when you discuss the State of Washington? That's right, a four-letter word called **RAIN!** Although water is essential to turf survival, it can also cause major problems when there is an overabundance. Such is the case in western Washington, where proper and extensive drainage is usually necessary.

Nearly all of us, at one time or another, have been involved in some type of drainage project. The most critical areas are generally near greens and landing zones where open stone drains are used. Unfortunately, the problems associated with open drains in these important play areas include:

1. Poor playing characteristics.
2. Poor visual quality.
3. Mower damage caused by loose rocks.

Placing sod over these drain lines minimizes the effectiveness of the drain, so an alternate method is needed to allow the dual

purpose of rapid surface water removal while addressing the three aforementioned concerns.

The golf course superintendent at Canterwood Golf & Country Club, Mark Cupit, has discovered an answer to this problem that has proven very effective during the past three years. It involves a four-step program that includes the following:

1. Locations near greens and landing zones are selected for drainage installation. A 4"-wide drain line is excavated using a trenching machine, a perforated drain tile is installed, and pea gravel is placed to within 1" to 2" from the surface. The remainder is capped with a medium/coarse sand.

2. Although step one is normal, Mark's turf tip is evident in step two. To address the problems cited earlier (loose rock, poor visual quality, and playing conditions), a grass cell paver is cut in half to a width of 6". These pavers are commonly used in high-traffic areas, yet are perfectly suited

to covering a drain line *when turned upside down*. The holes in the bottom are now on top, with a smooth surface and open pathways for water to enter the drain line.

3. The 6"-wide paver is driven into the ground over the 4"-wide drain line. The extra inch on both sides provides complete stability for mower and foot traffic, while keeping the drain rock and sand in place.

4. As grass begins to cover the drain line, string trimmers can be used to keep the openings free of debris, or turf can be allowed to slowly cover the pavers. If they are placed on the collar, the pavers also need to be periodically raised as topdressing builds up the surrounding profile.

This idea has worked successfully for three years on collars, green surrounds, tees, and fairway landing zones. Although it may not be the answer to all the drainage problems on your golf course, you too may fall in love with Cupit's Narrows.

Pavers installed for three years (left) display good turf coverage when compared to newly installed pavers (right).



Strategies for Successful Long-Term Maintenance of Golf Courses

by **BEN CRENSHAW**

Principal, Coore and Crenshaw, Golf Course Architects

LET ME get one thing straight here. My topic is "Strategies for Successful Long-Term Maintenance of Golf Courses." I can just hear everyone now — "Here comes the touring golf professional talking to all the superintendents on how to care for their golf courses." I assure you, I come knowing well that I am just at the incubation stage in my life of doing something other than playing golf.

First of all, I'm happy that Byron Nelson is receiving the Old Tom Morris Award at this conference. I know of no other kinder gentleman in the world who's meant so much to golf. When you meet and know eminent people like Harvey Penick and Byron Nelson, you feel blessed. Byron has not only been a marvelous player, but he's been interested in many other facets of the game. We can only learn from people like that, and I think it's only fitting that he's receiving the Old Tom Morris Award.

My knowledge about the life of Old Tom Morris means so many things to me. I've always loved one of Old Tom's quotes, and it relates to some of the things I'm going to say. It relates to the Old Course at St. Andrews and the amount of play they've enjoyed over the centuries — "She (meaning the Old Course) needs a rest even if you don't." That quote is a very, very appropriate statement today.

Most of the opinions I'll share today are just that. They're opinions and observations based upon my understanding of the importance of superintendents, how they communicate, and how important their work is. I know that it's a wonderful thing that we enjoy this great game as we do. We're enjoying the best of times, at the height of the golf industry. Everyone is coming to the game. We have so many converts it's unbelievable. There are lots of different ideas as well. I would just like to go on record as saying that whether it be a public, semi-private, or private course, please think about days of rest. Give the men and women a time to work on their golf courses. They need it sorely, I can tell you that.

My architecture partner is Bill Coore. Bill and I met about 1985 and we started talking



Ben Crenshaw

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philosophy. He had worked under Pete Dye. Pete employed him on construction jobs, and of course he loved architecture from the start. But he was selected for a different role when he came to Texas. Pete and Roy Dye built Waterwood National in east Texas. Six or eight months into the process, they needed a superintendent. They pointed at Bill and said, "All right, you're it. You're going to take care of the golf course."

Bill said, "I don't know anything about taking care of a golf course."

"Well, you'd better find out, because you're it."

That was Bill's introduction.

Throughout a process of time he sought out people for information, and Bill has taught me the importance of seeking out information from superintendents. We've learned a great deal from you, and we plan to use your expertise in the future. We've worked with Jerry Takuchi, from Houston Country Club; Doug Petersan, previously at Prairie Dunes and now at Baltimore Country Club; Bill Shrum, at Denver Country Club and Brook Hollow, where we just renovated their 18 holes; Bob Randquist, of Southern

Hills, where we added nine holes; and countless other people.

What is demanded of superintendents these days boggles my mind. Superintendents have got it tough. First of all, we all know how subject to the weather we are. We're like farmers in that regard. There are a lot of different things demanded of the superintendent in terms of people's viewpoints and philosophies, too. There are new converts to the game, and sometimes what they want in their minds is very unrealistic in reality. For instance — green speeds. Now, there's nobody who loves fast greens more than I, but I think that there comes a time when we really have to temper our green speeds for the sake of the health of the grass.

In my opinion, we've reached the brink on other things, too, including balls and implements. I'm antique enough to know that the technology we've got is tremendous, and that we're hitting golf balls distances that we've never thought we would. I happen to be, and will be for the rest of my golfing life, a protectionist when it comes to defending the timeless designs of some of the older architects. We can't let technology ruin these designs.

I was fascinated by Joe Baidy's presentation about the Donald Ross course at Acacia Country Club. I think he gave a beautiful description of how you can transport Ross's original ideas into today, and how Donald Ross and certain other people with great imagination can create timeless courses and defend the spirit of the game.

On many golf courses that you see in older books, let's say in the 1920s and even going back to the early 1900s, it seems that there was a dearth of trees across the landscape. The architects were interested in the ground and undulations, and they truly did look for gently rolling properties. In all, they didn't move much soil. But over a long period of time, trees, just like humans, grow and mature. They change a lot of perspectives and change angles on golf holes. Sometimes you have to make a subjective conclusion to say, "This is the intent of the architect, and this is where this golf hole

should be attacked from, from a strategic point of view.”

It's a painful process, but you have to talk to memberships about trees. I think everyone is very protective about trees, but I've also learned the importance of making a choice between having good grass or lots of trees. It's a very painful thing when you try to explain to someone, “We're really going to have to prune that tree or we're going to have to take it out.” Hopefully, the club has some old pictures to show people; I think it helps tremendously.

For instance, Brook Hollow Golf Club in Dallas, Texas, is a Tillinghast course. We had a wonderful old

aerial shot showing the very beautiful roll to Brook Hollow, but there were no trees. There were hundreds of bunkers in the old aerial, but it's a different proposition today. It's a very difficult thing to go back to the original, and I think you have to temper them in some regard.

I think everyone knows that the West Course at Royal Melbourne in Australia was designed by Dr. Mackenzie. Alex Russell, a fine Australian player, picked right up where Dr. Mackenzie left off and built the East Course. It's very, very hard to tell them apart. In my mind, I don't think that I've ever seen a golf course that is as well taken care of and depicts Mackenzie's intent as well as Royal Melbourne. It is a spacious, gigantic, and just plain big course. Some of the opinions that I have about the golf course you have to take with a grain of salt because Royal Melbourne sits on 600 feet of sand, and it's the most beautiful property you have ever seen.

There is a book that has come out that's fascinating and is called *The Complete Golf Course — Turf and Design* by Claude Crockford. This man took care of this golf course for 40 years; it was his life. He studied its every shape and form.

I really would like to see people get hold of this book. The book is available through Peter Thompson's office in Australia: Thompson, Wolveridge and Associates, 11 Craford Street, Mount Eliza, Victoria 3930, Australia. The book is fascinating. He thought thatch was the absolute bane of



The seventh hole at Royal Melbourne in Australia demonstrates the overall spacious, gigantic proportions of this beautiful golf course.

all turf problems, so he would go about systematically relaying turf on the greens. After removing the sod, the thatch was cut off the bottom and the turf was laid on different parts of the golf course in different directions.

They call the golf course superintendents in Australia *curators*. A curator takes care of this course. It strikes me as a unique course for a lot of reasons. First of all, it has a tremendously different climate; it can be very hot. I played one day with Greg Norman when it was 105°. It was about 6 percent humidity with a very hot wind blowing from the north, the equator. The turf was tremendously stressed. At the end of the day I said, “You've got to put some water on this thing or it'll go away.” And at the end of the day they came with little hand-held hoses. They came across the green, sprinkled it a little bit and that was it. I thought, “This course is unbelievable to go through these stresses.” There's no question, it's marvelous golf terrain.

The seventh green was built by Claude Crockford. The old Mackenzie hole was too close to the clubhouse. The seventh hole is a 160-yard par 3, and it's an absolute devil. And I don't think I've ever seen more immaculately prepared approaches. The areas in front of the greens are just extensions of the greens themselves. Those approaches are topdressed, rolled, hand cut, and are just marvelous.

Every time you read about golf courses in old books, the approaches were so much of the thought process when building the green.

To me, these are areas that can serve with all classes of golfers. It's an area they use, but in my mind, you've got to be able to maintain a consistent turf or people won't use it. At Royal Melbourne, they're beautifully portrayed, they're natural, they're rolling, and it's a wonderful presentation.

Sometimes in windy conditions the greens are very keen, and sometimes it pays to play to the left or right of the flagstick. I think a lot of people come to the game and think that you have to play directly at the flagstick all the time. Well, if you play in Scotland or other places, you have to learn to play for position, but it relates to what the golf course gives you and how the ground is prepared.

Fairway bunkers don't necessarily have to be flat. I think a flattish nature can help provide a nice recovery, but a long time ago a bunker was a bunker, and you were meant to lose half a shot sometimes. Most of the courses built back then were predicated on match play. You played to a certain position and you had a certain advantage over your opponents.

Through my readings there is no one like Bobby Jones. I don't think anybody wrote like he did. For example, *Bobby Jones on Golf*, published in 1966. It is still very appropriate today. This is an example of his architectural statements: “It seems to me that many courses are designed with an eye on difficulty alone. In the effort to construct an exacting golf course that will sort out the experts, the average golfer who pays the bills is entirely overlooked. Too often the worth



(Top) Long, intimidating carries off the tee or to the green are fine for professional or low-handicap golfers, but the average golfer should have a choice — a place to bail out if he wants to. (Above) Over time, trees change the appearance of a course and the strategy needed to play the hole. Sometimes hard decisions need to be made about removing trees for the sake of maintaining architectural integrity.

of a layout is measured on how successfully it has withstood the efforts of the professionals to better its par or lower its record. From the standpoint of the inexperienced player, there is nothing so disheartening as the appearance of a carry that is beyond his best effort and that offers no alternative route. In such a situation there is nothing for the golfer to do, for he is given no opportunity to overcome his deficiency in length for either accuracy or judgement. The problem that is supposed to be offered to him becomes no problem at all when he has nothing to look forward to." I'll just say one thing. In a lot of instances these days, the emphasis is all on carry, and in my mind, it's an unthinking proposition. It would be more judicious to work out an alternate route in a lot of instances.

Jones also wrote, "In an article I once received from the United States Golf Association Green Section, the statement was made

that 'we believe that much of the difficulty in maintaining putting greens is due to excessive use of water. The greenkeepers and green committees point out that they do this in self-defense, because golfers all want soft greens.' I think that's a pretty true statement these days. I was once asked how I regarded the practice of keeping green surfaces soft, even soggy. Looking at the question purely from the playing standpoint, I have to agree with this next statement: "There can be little question that the great mass of golfers in this country prefer the greens very soft. Such conditions make play much easier for all classes of golfers, and is in great measure responsible for the fact that tournament scoring is uniformly lower here than at the seaside links and the British Isles."

I cannot say which induced the other, but what he believes in the one for placing of our bunkers very close to the putting surfaces, and the maintenance of soggy

greens that will hold any kind of a pitch, whether struck with backspin or not. It seems to me that the ideal green would be sufficiently soft only to hold the properly played pitch, and by hold, I do not mean it to stay within a very few feet. To carry out the intention of the designer, conditions ought to be such that a definite penalty should be sustained by the player who puts himself out of position. In this connection, I think one of our greatest needs is a fairway grass or treatment that will make the ground in front of our greens more reliable. If the greens themselves are to be maintained in a firmer condition, the need must arise on occasion to drop the ball short of the putting surface, allowing it to roll the remaining distance. I know very few courses where this is possible without great uncertainty. I believe in that. I think there's a way of presenting courses to players who can't carry the ball. There's got to be something for them to do as an alternative.

Let me say one thing about slow play. Let's suppose for one minute that there were no yardage indicators anywhere on the golf course. It seems when I play with my friends a lot of people usually say, "What's that yardage over there?" In some instances, they only hope to carry the ball a certain distance. Can you imagine if there weren't any indicators? You'd have to use your brain and actually think about a club to hit before you got to the ball. It seems to me that we're taking the stuffings out of this game.

The game has meant a lot to everybody here; it's meant everything to me. I've seen a lot of things I don't like in the game. I think it's a way of life, and I think there's nothing like a superintendent. Superintendents have the toughest job in the world. I cannot salute you enough. You put up with everything in the world. Let's face it, if there were 15 members from a course plus me in a room, you'd probably get 15 different ideas — from how to present things to what architecture means. I'm just saying that I'm certainly not alone in recognizing how important you are.

I think we're on the cutting edge of discovering new or improved grasses. The turf-grass universities all over the country are coming up with some incredible grasses. We all know that we're going to have to live with less water for irrigation in the next 10 to 15 years. So, it forces us into a situation that we have to keep searching. I'd be totally remiss if I didn't mention Dr. Milt Engelke, at Texas A&M University; Dr. Terry Riordan, at the University of Nebraska; Dr. Virginia Lehman, who's in Oregon now; and the USGA. They were there when I got started in trying to learn something about turf, and it's remarkable. Carry on this process; I think you're the most important people in the game.

THE BEST TURF TIPS OF 1994

Seed Storage: Protect Your Investment

by **KEITH HAPP**

Agronomist, Mid-Atlantic Region, USGA Green Section

QUALITY TURF begins with quality seed. Research has shown that the manner in which grass seed is stored can greatly influence establishment rates, percent germination and seedling vigor. Storing seed in a cool, dry environment can prolong the high germination percentages that are commonly reported on the seed label. Whether overseeding tees, the practice area, or fairway divots, a common link for good results is utilizing seed that will germinate rapidly to fill in voids and reestablish the playing surface.

Normally, quality grass seed is purchased and then stored in an area of the maintenance center in anticipation of utilizing that seed in the future. Seed purchases usually take place well in advance of actual use, often due to the limited availability of the specific varieties of seed the turf manager desires.

Unfortunately, seed stored in an out-of-the-way place often is mixed with older seed lots, exposed to environmental fluctuations (such as humidity, which reduces germination rates), or can even become food for rodents. There are better ways to store seed than to simply throw it in the corner or in plastic trash cans. Controlling these variables is the topic of this turf tip. Think of it as the same proactive approach so often employed for turf machinery — preventative maintenance — but utilized for seed storage.

Bruce Cadenelli, golf course superintendent at Caves Valley Golf Club, located in a suburb of Baltimore, Maryland, had the opportunity to help design his maintenance facility. A key feature was an enclosed topdressing storage area. This area keeps the topdressing dry, which facilitates weekly applications to the putting green surfaces and in preparing seed/soil mixtures. At the back of the topdressing storage area, a seed storage locker was also constructed. The structure was completed by utilizing the carpentry talents of a staff member and an investment of about \$1,500 in building materials. The dimensions are 16 feet long by 4 feet deep by 8 feet high. The large double doors, each five feet wide, allow for easy handling when preparing divot mix or replenishing seed inventories. Due to intensive overseeding programs throughout the

course, large quantities of seed pass through the seed storage locker. Easy access also helps the staff practice proper inventory control (first in/first out). Inventory control is critical, especially for the newer varieties of perennial ryegrass enhanced with endophytes.

The inside of the seed storage locker was covered with sheet metal. This greatly reduces the chance of mice climbing inside and nesting or feeding on the seed. Vents were installed at the top of each end of the locker to allow for positive air flow. Steady air flow helps minimize potential moisture fluctuations that can affect seed viability. The vents were covered with medium-gauge wire mesh to prevent rodents from invading the seed reserves. Also, the storage locker was built several feet above floor level, allowing large quantities of topdressing to be delivered and stored without blocking the doors of the seed storage locker.

After the seed and topdressing are combined, the mix is transferred to a storage

bin located in the equipment storage area. The topdressing/seed mixture bin is filled daily. Staff members have easy access to divot mix containing quality seed. Filling divots with a mixture containing rapidly germinating seed can reduce weed establishment. As we all know, the first line of defense against weed invasion is strong, healthy turf.

There are many ways to store and manage seed inventories. Some are better than others. When turf loss is experienced, whether large or small, viable and rapidly germinating seed is important. To help insure quick establishment and seedling vigor, seed handling and storage should not be overlooked. Annual investments in quality seed are often quite high, so proper storage techniques are important to protect that investment.

Examine your current seed storage procedures. If improvements are in order, consider Bruce's strategy. Protect the integrity and quality of your seed by improving your seed storage techniques.

The doors on the seed storage locker were designed to allow for easy access. The interior was covered with a light-gauge metal sheeting, which greatly reduces the potential for rodent invasion.



Every Picture Tells a Story

by **GEORGE B. MANUEL**

Agronomist, Mid-Continent Region, USGA Green Section

WITHOUT QUESTION, communication is one of the biggest keys to unlocking a successful career as a golf course superintendent. Verbal and written skills are most commonly thought of in this category, but Tommy Witt, CGCS, of Bent Tree Country Club in Dallas, Texas, has added another dimension to his ideas and presentations to bring them more clearly into focus. Each day he carries a camera with him to take advantage of a wide range of photographic opportunities. The slides and/or pictures depict a range of topics, including routine needs (such as replacing a broken valve cover) or major golf course renovation projects.

Although many superintendents take pictures, few organize them as well as Tommy. They become part of a permanent record system in his office, currently comprising over 4,000 pictures. Each photo is numbered and then put in an album. A description of the work and/or problem is documented in a log book for easy access whenever questions arise. The benefits of having an organized library of photographs are numerous. Consider the following scenarios at your course.

Before and After Photographs

Pictures of every problem area throughout the course can be taken and posted in an album with accompanying descriptions. As these areas are renovated, pictures of the corrective action should also be taken and the work accomplished described (beneath the photo), including the cost of the project. The pictures not only help identify needs for improvement, but they also document the efforts of the superintendent and his staff.

Frequently, projects such as drainage are identified during one time of the year, but the improvements cannot be made until a later date. Pictures provide the documentation to map the area to ensure that the location of the problem is not forgotten.

Master Plans

Every club should have a Master Plan or Long-Range Plan. Photos can be used throughout every stage of the plan, from conception to completion. These visual aids help golfers chart the progress the course makes over time and give a better understanding of the work load involved.



"Before" and "after" shots document the efforts of Tommy Witt's maintenance staff.



Budget Reviews and Proposals

At the end of a budget period, have you ever been asked, "Why are you so far over the budget?" Have they forgotten the flooding, hailstorms, or high winds that hit the course? Do the players really remember the severity of the storm? Pictures can quickly refresh one's memory by documenting and justifying the overtime spent for cleanup.

Green committees are constantly changing. Individuals who are not familiar with the superintendent's needs or operations may be placed in charge of approving the golf course maintenance budget. The use of accompanying pictures can help clarify the needs of the course and the staff.

Meeting Presentations

Armed with a carousel of slides, the superintendent can easily make presentations to

green committees or at general membership meetings. Herein lies a tremendous opportunity to showcase the contributions, efforts, and accomplishments of the golf course maintenance staff. At least once per year, take the opportunity to both show and tell your golfers the progress that has been made and the challenges that lie ahead.

Employee Education

Pictures provide an excellent vehicle for training new and old employees. Excessive wear can take place as mechanical rakes go in and out of bunkers in the same area. Disease symptoms on the greens can be photographed to educate those who mow and/or change cups. This type of training develops pride in the crew as they begin to gain confidence in identifying problems throughout the course.

Resume vs. Portfolio

When new employment opportunities arise, don't just mail a cover letter and a list of your qualifications. Send a portfolio of pictures documenting your accomplishments. This will set you apart from and give you a clear edge over the many other applicants vying for the same job.

Conclusion

Photography is a great tool that everyone can utilize to his or her own advantage. Use it to motivate employees, document problems, and record successes you achieve throughout the year. Every picture really does tell its own story; make it a part of your communication skills.

Mobile Office Trailers as Interim Offices

by **STANLEY J. ZONTEK**

Director, Mid-Atlantic Region, USGA Green Section

MOST golf course superintendents need a better office. Unfortunately, many courses are not in the financial position to upgrade these facilities. This creates an impasse between the recognized need for a better work place and the financial realities of spending the money to solve the problem. What can be done?

Basically, there are two options. The first is to do nothing and be patient until the construction/improvement project can be completed. That is, do what you can to keep computers and disk drives dust-free, and improve lighting, ventilation, heating, and air conditioning. The second option is the subject of this turf tip: That is, the use of prefabricated mobile office trailers as interim offices.

Why Trailers?

Among the reasons for golf courses to use trailers as interim office space are their reasonable cost, ease of acquisition and setup, and the fact that they work so well! Many people are surprised at the relatively inexpensive cost of mobile offices, either to rent or buy, and perhaps this is why several golf course superintendents in the Baltimore area utilize trailers as temporary or semi-permanent offices. Trailers "work" and are easy to



Prefabricated trailers provide a viable option as interim office space.

"sell." The success in utilizing mobile offices at one golf operation can be used as an example for another facility.

How Inexpensive?

Costs can vary, but trailer options include several relatively small or used units that can be purchased for as little as \$5,500 (Country Club of Maryland's choice) to a larger, re-

conditioned unit like the one at Woodholme Country Club that cost approximately \$8,500.

Most trailer companies have many other models, up to and including new, larger and more expensive units. In some cases, mobile office trailers can become permanent or semi-permanent, depending upon the individual needs of each golf course. The point

is, the trailer companies provide a wide range of choices.

Monthly rental plans are also an option. Doug Petersan, superintendent at Baltimore Country Club, is exercising this option for an interim period until a new maintenance center is built. With impending construction expected, it made sense to arrange for a short-term rental versus an outright purchase. Again, every golf course situation is different.

Other costs associated with mobile trailers include utility hookups and the need to satisfy local zoning regulations. Also, once on a foundation, the trailer needs insulation and/or pipe heating, especially for winter protection in the more northern parts of the country. Several golf course superintendents have even chosen to landscape around their offices to make their appearance as good as their function.

Are office trailers the final answer to a better work place? Not really. There are never

any panaceas in golf course management. Mobile offices are an alternative solution, albeit a relatively short-term one or at least an interim step in the upgrading needed for the maintenance areas on many golf courses. Interestingly, one superintendent, Tildon Hankley, at Salisbury Country Club in Salisbury, Virginia, used his office trailer to identify the floor plan and area needs that were ultimately designed into his new office and maintenance facility when it was built at his course. His office trailer truly was an intermediate step.

The use of trailers as interim offices is not a new idea. From time to time we have seen trailers functioning as offices on golf courses. However, as more and more courses begin to use computers, facsimile machines, and other electronic equipment in their offices, the need for a dust-free and relatively climate-controlled office environment has become more important. In addition, more and more golf courses have secretaries/re-

ceptionists, assistant superintendents, and irrigation technicians who require office space to better perform their jobs. As the administrative needs of most golf courses have grown, seldom is there area available for additional office space in most maintenance buildings.

In summary, trailers are logical and cost-effective solutions to the need for additional space and an improved office environment. Such an office improvement can even elevate the professional image of the golf course management team. Even with the various details that need to be satisfied to locate and maintain a trailer as an office, this turf tip could be an option for some golf courses. Certainly, trailers are better work places than some offices we see. Perhaps David Nehila, the assistant superintendent at the Country Club of Maryland, said it best: "You've got to have something to work out of." Mobile trailers, as interim offices, can satisfy this need.

NEWS NOTES FOR SPRING



Jim Skorulski

Green Section Staff Changes

The USGA Green Section staff in the Northeastern Region has gone through some changes in recent months. Jim Skorulski has taken over responsibilities as agronomist for the New England area of the Northeastern Region, replacing Jim Connolly, who resigned to join Jacklin Seed Company, based in Idaho. Jim joined the USGA Green Sec-

tion staff in 1989 and has made over 500 Turf Advisory Service visits in the Northeastern Region. He also has authored articles for the *Green Section Record* and other industry publications, and he has spoken on a wide variety of turfgrass and golf course management topics.

A native of New Hartford, New York, Jim earned a Bachelor of Science degree in forest biology from Syracuse University's College of Environmental Science and Forestry. He also attended Cornell University to complete a Master of Professional Studies degree in 1990. His work in graduate school consisted of developing integrated pest management strategies for golf courses.

Robert Y. Senseman, CGCS, has been appointed as the agronomist to replace Jim in the Northeastern Region. Bob joins David Oatis, Director of the Northeastern Region, and will be based out of Golf House. He will be visiting TAS clubs and courses in the Northeast, with the majority of his time concentrated in New Jersey and New York.

Bob joins the Green Section staff with a broad turfgrass background. Most recently he worked as golf course superintendent at Columbia Edgewater Country Club in Portland, Oregon, where he also served as President of the Oregon Golf Course Superintendents Association. Bob has worked as a golf course superintendent for the past 12 years in Oregon and California, but he is no



Robert Y. Senseman

stranger to the East. He also worked on a golf course in Washington, D.C., before moving west.

Bob received his Bachelor of Science degree in horticulture from Oregon State University in 1983. He will be relocating to New Jersey with his wife, Mary, and their two children, Christine and Michael. The Green Section joins in welcoming Bob to its staff.

Grand Slam Golf Course Superintendent



In golf, the term "grand slam" applies to winning the major golf championships. In 1993, the phrase is applied not to a golfer, but to the person in charge of the golf course. Chris Hague (left) was recently awarded a congratulatory plaque from the USGA by Tim Moraghan, Agronomist for Championships, as the first golf course superintendent to play host to the three major USGA Open golf championships. Chris currently is the golf course superintendent at Crooked Stick Golf Club in Carmel, Indiana, which held the 1993 U.S. Women's Open. Chris also was responsible for preparation of the 1983 Senior Open and 1991 U.S. Open at Hazeltine National Golf Club in Chaska, Minnesota.

Donation for Turfgrass Research Program

USGA Green Section



Joe Moris (middle) and Kevin Chunis (right), President and Vice-President, respectively, of the Minnesota Golf Course Superintendents Association, present a check for the benefit of turfgrass research to Jim Snow, Green Section National Director, who is responsible for the activities of the USGA Turfgrass and Environmental Research Committee. The donation marks the eighth year the MGCSA has contributed to the USGA Turfgrass Research Program. The presentation was made at the GCSAA Conference and Show in Dallas, Texas, in February.

Green Section Record Binders



TIRED of trying to find that issue of the *Green Section Record* located somewhere in the stacks of back issues strewn about your office? Do you want to keep your past issues close at hand for easy reference? The solution has arrived! Custom-made binders have been designed especially for the *Green Section Record*; each will hold two years' worth of issues. The binders are a handsome forest green and have the USGA logo and *Green Section Record* emblazoned on the spine and cover. The binders cost \$9.95 each (plus shipping and handling) and can be purchased by calling the USGA Order Department at 1-800-336-4446.

TURF TWISTERS

IDENTIFY

Question: What is the best way to submit disease samples to a plant pathologist for identification? (Mississippi)

Answer: Your sampling technique is important for the pathologist to accurately diagnose the problem. The sample should include a portion of the diseased area *and* a portion of the adjoining healthy turf. A 4"-diameter plug intact with the roots and the above-ground plant material is preferred. It is also helpful to submit a snapshot of the diseased area. It is very important to let the pathologist have an idea of what the symptoms look like.

THE END RESULT

Question: We have a five-year-old golf course that needs extensive tree removal. The Green Committee has refused to allow us to remove any trees. Any ideas to help us get past this logjam? (Washington)

Answer: Quite often the golf course architect will leave trees on a site for the first few years to get feedback from the players. It sounds like this would be a good time to bring back the original golf course architect to discuss the tree situation in detail with the Green Committee and/or Board of Directors. This checkup can go a long way in educating players about the negative impact of too many trees. Using an outside expert is a very effective method to sell good ideas.

FOR BERMUDAGRASS SPRIGGING RATES

Question: We are in the planning stages of completing a renovation program on our bermudagrass greens, and are uncertain about sprigging rates for the regrassing operation. What sprigging rate do you recommend? (Florida)

Answer: Recommendations for sprigging rates for bermudagrass greens are made in bushels per 1,000 sq. ft. Typically they fall within a range of 20 to 30 bushels per 1,000 sq. ft. for the initial sprigging operation on new greens. Usually 20 to 25 bushels per 1,000 sq. ft. is used to establish bermudagrass greens; however, when time is a factor in opening the greens for play, the higher end of the sprigging range is utilized.