

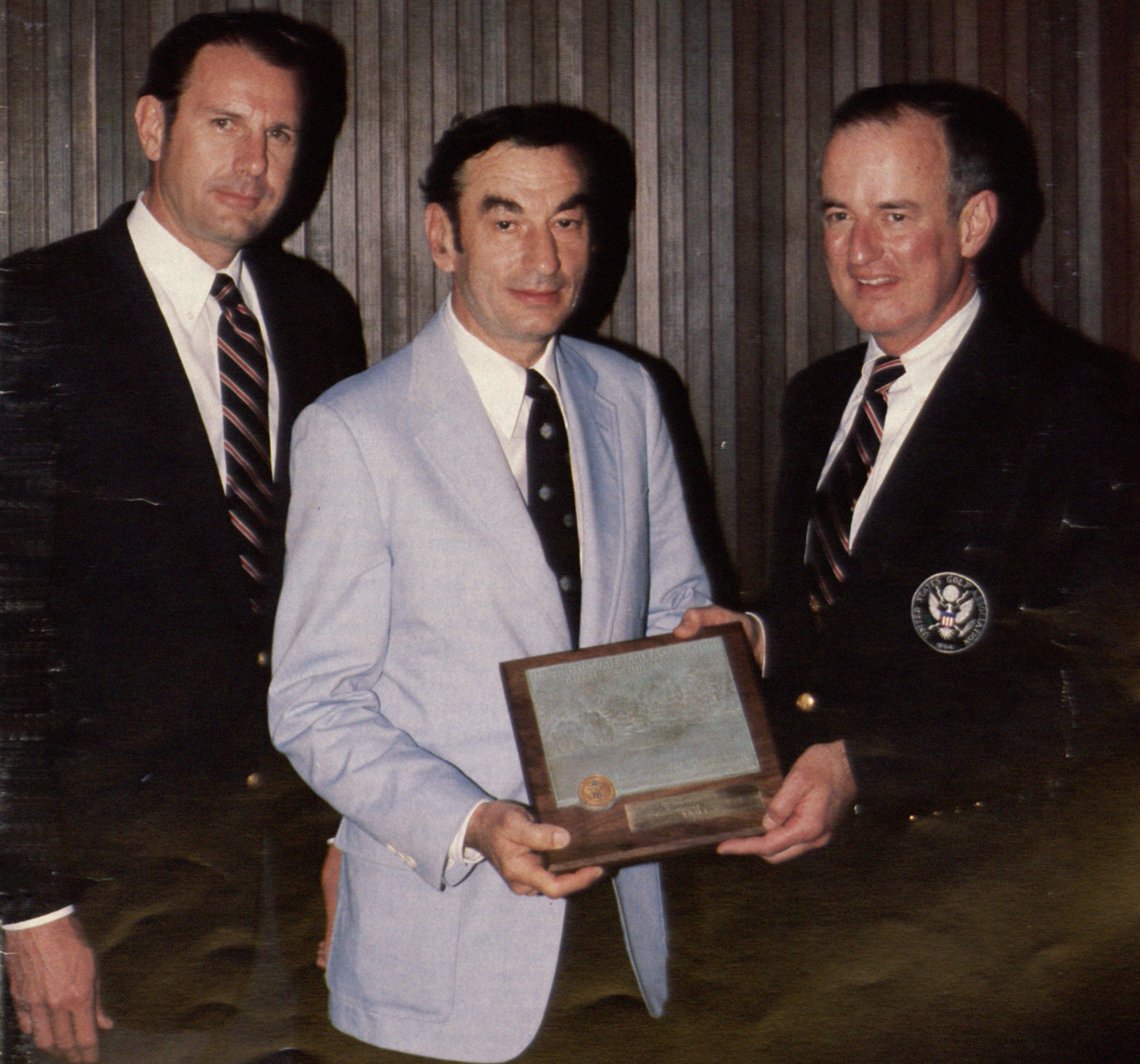
A Publication on  
Turfgrass Management by the  
United States Golf Association

GREEN SECTION LIBRARY  
DO NOT REMOVE

March/April 1981

USGA

# Green Section RECORD





# USGA



# Green Section RECORD

## EDITOR:

Alexander M. Radko  
**MANAGING EDITOR:**  
 Robert Sommers  
**ART EDITOR:**  
 Miss Janet Seagle

Vol. 19, No. 2

MARCH/APRIL 1981

## GREEN SECTION COMMITTEE CHAIRMAN:

**Stephen J. Horrell**  
 3007 Dehesa Road, El Cajon, Calif. 92021

**NATIONAL DIRECTOR:** Alexander M. Radko

**ASST. NATIONAL DIRECTOR:** Carl H. Schwartzkopf  
 United States Golf Association, Golf House,  
 Far Hills, N.J. 07931 • (201) 766-7770

## GREEN SECTION AGRONOMISTS AND OFFICES:

### Northeastern Region:

United States Golf Association, Golf House,  
 Far Hills, N.J. 07931 • (201) 766-7770  
 Carl H. Schwartzkopf, *Manager*  
 William S. Brewer, Jr., *Senior Agronomist*  
 James T. Snow, *Senior Agronomist*

### Mid-Atlantic Region:

Suite B4, 9017 Forest Hill Avenue,  
 Richmond, Va. 23235 • (804) 272-5553  
 William G. Buchanan, *Manager*  
 Patrick M. O'Brien, *Agronomist*

### Southeastern Region:

P.O. Box 4213, Campus Station,  
 Athens, Ga. 30602 • (404) 548-2741  
 James B. Moncrief, *Manager*  
 Charles B. White, *Agronomist*

### North-Central Region:

P.O. Box 592, Crystal Lake, Ill. 60014 • (815) 459-3731  
 Stanley J. Zontek, *Manager*

### Mid-Continent Region:

17360 Coit Road, Dallas, Tx. 75252 • (214) 783-7125  
 Dr. Douglas T. Hawes, *Manager*

### Western Region:

Suite 107, 222 Fashion Lane,  
 Tustin, Calif. 92680 • (714) 544-4411  
 Donald D. Hoos, *Manager*  
 Timothy G. Ansett, *Agronomist*

- 1** **Dr. Joseph M. Duich Named Recipient of the 1981 USGA Green Section Award**
- 2** **Quality Playing Conditions for Every Day**  
by Robert V. Mitchell
- 5** **Effective Use of Our Natural Resources**  
by Melvin B. Lucas, Jr.
- 7** **Quality Playing Conditions and Priorities**  
by Edward C. Horton
- 10** **Quality Playing Conditions and Budgeting**  
by C. William Black
- 12** **Designing Golf Challenges for Economy and Maintenance** by Richard M. Phelps
- 16** **Quality Playing Conditions and Proper Equipment** by Richard H. Eichner
- 18** **Experiences from the Field and Quality Playing Conditions**  
Sand Bunkers by Stanley J. Zontek  
Overseeding Bermudagrass Greens by James B. Moncrief  
Soils of The Southwest by Dr. Douglas T. Hawes  
Selective Mowing by William G. Buchanan  
Topdressing by Donald D. Hoos
- 23** **The Challenge of Industry Hills**  
by William H. Bengeyfield
- 25** **Conditioning the Golf Course**  
Grooming Greens for Play by James T. Snow  
Fertility — Using Lower Levels of Nitrogen by Timothy G. Ansett  
Little Things That Count by William S. Brewer, Jr.  
The Stimpometer — A Management Tool by Patrick M. O'Brien  
Water Use and Energy Conservation by Charles B. White

**Back Cover** **Turf Twisters**

©1981 by United States Golf Association. Permission to reproduce articles or material in the USGA GREEN SECTION RECORD is granted to publishers of newspapers and periodicals (unless specifically noted otherwise), provided credit is given the USGA and copyright protection is afforded. To reprint material in other media, written permission must be obtained from the USGA. In any case, neither articles nor other material may be copied or used for any advertising, promotion or commercial purposes.

GREEN SECTION RECORD (ISSN 0041-5502) is published six times a year in January, March, May, July, September and November by the UNITED STATES GOLF ASSOCIATION, Golf House, Far Hills, N.J. 07931. Subscriptions and address changes should be sent to the above address. Articles, photographs, and correspondence relevant to published material should be addressed to: United States Golf Association Green Section, Golf House, Far Hills, N.J. 07931. Second class postage paid at Far Hills, N.J., and other locations. Office of Publication, Golf House, Far Hills, N.J. 07931. **Subscriptions \$3 a year.**

## Cover Photo:

(Left to right) Stephen J. Horrell,  
 Green Section Committee Chairman;  
 Dr. Joseph M. Duich,  
 Green Section Award Recipient;  
 Will F. Nicholson, Jr., USGA President.



Photograph by LARRY GOLDSMITH



**1981  
GREEN SECTION  
EDUCATION  
CONFERENCE**

## **Dr. Joseph M. Duich Named Recipient of the 1981 USGA Green Section Award**

---

**I**N 1961, the USGA established the Green Section Award to honor those who deserve special recognition for distinguished service to golf in any phase of work with turfgrass — research, education, extension, superintendence, maintenance, and management.

The USGA believes that many individuals have made immeasurable contributions respecting the arena upon which golf is played. Their contributions and services may be evidenced by their achievements over a number of years or by a single act.

In continuing to present the Green Section Award, the USGA wishes to identify, celebrate, and recognize individuals who exemplify outstanding dedication to golf through their work with turfgrass.

Dr. Joseph M. Duich, who began his career as a 14-year-old boy pushing a hand greens mower, has been dedicated to golf turfgrass improvement in the succeeding 38 years from student to teacher-researcher.

Dr. Duich took his training under the late H. B. Musser, professor emeritus of agronomy at Penn State University, the 1966 Green Section Award recipient. He earned his bachelor's degree in 1952 and his Ph.D. in 1957 in agronomy.

Over the years, Dr. Duich has contributed significantly to better golf turfgrass through research, teaching, and education. His turf research contributions have been concerned with grass varietal improvement, varietal evaluation, roadside development, weed

control, turf-disease relationships, fertilization, and soil modification. Among his breeding contributions are the varieties Pennstar Kentucky bluegrass, Pennfine perennial ryegrass, and the Penneagle and Penncross bentgrasses.

As a result of his knowledge, perseverance and dedication to seed quality, he has devoted considerable effort in the area of turfgrass seed specifications.

Concurrent with the research program has been his role in the phenomenal success of the two-year Penn State Turfgrass Winter Course Program which he has directed since 1959. This highly selective program has graduated 636 students from 24 states, Canada, Mexico, and France. Dr. Duich has been instrumental in raising funds for 111 turf student scholarships, the largest such program in the United States.

Dr. Duich serves as the program's technical advisor and has directed the work of many undergraduates, M.S. and Ph.D. candidates. Many of his former students now hold top positions as golf course superintendents and in other facets of the turfgrass industry, mainly because of his tireless efforts to promote training positions and to direct the job placements of the students with employers.

Through his efforts as turfgrass project leader, the Penn State Turfgrass Project has developed an extremely effective research-teaching team. Dr. Duich has raised nearly \$300,000 in

non-governmental research funds and \$85,000 in equipment. As a result, research facilities have expanded nearly tenfold.

**D**URING THE PAST 22 years, Dr. Duich has presented over 150 papers and addresses to national, regional, state, and local associations and groups. He has advanced the turf profession in his personal consulting role with dozens of golf clubs in the United States and Canada, with key industrial organizations such as DuPont, Sun Oil, Eli Lilly, and AT&T; and with seed producers, seed companies, sod growers, and insurance companies. He has also served as a turf consultant to several professional golf tournaments.

For his outstanding teaching, Dr. Duich received the Gamma Sigma Delta Teaching Award in 1974 and the Northeast American Society of Agronomy Teaching Award in 1976. Also in 1976, he received the Distinguished Service Award from the Golf Course Superintendents Association of America due in part to his teaching contributions and effectiveness. Among his other honors, Dr. Duich was named a Fellow of the American Society of Advancement of Science in 1964 and was the recipient of the Distinguished Service Award of the Pennsylvania Turfgrass Council in 1974. Dr. Duich is an honorary member of several turfgrass and golf course superintendents associations.



# Quality Playing Conditions For Every Day

by **ROBERT V. MITCHELL**, CGCS, Superintendent of Golf and Grounds, The Greenbrier, White Sulphur Springs, West Virginia\*

**T**HE UNITED STATES GOLF Association is an organization of member clubs. It is the governing body of golf in the United States. Its purpose, stated simply, is to preserve the integrity of the game as we know it. The USGA stands for good playing conditions and fair competition! Part of its program involves the Green Section, which is devoted to the cause of better turf for golf. From the outset, the objective of the Green Section has been to improve and provide the best possible playing conditions for the game. I concur, and I'm sure you do, with this philosophy and the objective. The Green Section's ideals and objectives parallel those of the Golf Course Superintendents Association of America, a fact that explains why the Green Section's Annual Conference on Golf Course Management was held at the GCSAA's Annual Conference and Show.

All this week we've been hearing about challenges: what they are, how do we meet them effectively, those that lie ahead, and of new research information that will help us cope with the changing times. I would like to begin our program today by discussing with you "Quality Playing Conditions for Every Day."

Probably every golf course superintendent feels that he strives to produce the best playing conditions possible every day of the week. However, I believe if you examine your operation closely, you may find that you gear the work schedule toward perfection on certain days each week. Perhaps it is the day the boss plays, the men of the club play, or on weekends when most members play. Do you really strive to provide peak conditions daily? I am

sure you have heard the comment that all work is done only on Ladies' Day.

Having had experience at public, private, and resort clubs, I suspect that quality playing conditions do not exist daily on most courses. From my observations, private clubs work toward peak conditions for particular days. My comments are directed as a challenge to you to reorganize your work schedules to offer the golfer, as nearly as possible, the same good playing conditions for every day. Certainly there will be differences, but strive to minimize them. Admittedly, the area that gives superintendents most difficulty is the challenge to keep roughs mowed uniformly. Roughs are last in the pecking order of mowing, and they usually cannot be mowed rapidly because of the acreage involved.

Probably the one factor that will limit us in producing the same playing conditions daily is manpower. Our society today is accustomed to having Saturday and Sunday off, and that makes it difficult for us to consistently do as effective a job of maintenance on weekends as on weekdays. But the golf course must be tended to routinely, not only for the good of the game, but for the good of the grass on which the game is played.

**R**ESORT GOLF is quite different from private club and public course golf. Our typical golfer is a three- to four-day guest of the hotel, and he usually attends meetings for part of the day and then plays golf. He expects and is given quality playing conditions, and he pays for it dearly. Further, he is concerned with the course only during his stay. Consequently, two things must happen: (1) the course must be available, and (2) the course must be in good enough condition to sufficiently impress him and make him want to

play again. When this occurs, we can count on him to talk favorably of our facilities, which in turn creates new business.

One real difference between resorts and most private clubs is that resort courses aren't closed one day of each week. The Greenbrier has three courses available during the season and one available for most of the winter. We almost never close! If golf carts can maneuver safely, we are open. Seldom is the course closed to carts. We are a profit-making company, and we need both green and golf cart fees to succeed.

Obviously, we do have the problem of repairing golfer and cart damage that inevitably occurs during wet weather.

Another important function is to plan our work to insure player acceptance daily. I'd like to describe briefly how we work our maintenance people



\*Paper presented by **RICHARD C. BLAKE**, CGCS, Woodstock C.C., Woodstock, Vt.





*During winter, quality playing conditions still prevail at The Greenbrier.*

to achieve a good, consistent playing golf course. We use a foreman on each course with a crew of seven to nine men, depending on terrain and amount of hand work. The fourth foreman has a "special project" crew of four. The entire labor force is union organized, which means that job classification, seniority, and other usual stipulations are in effect. Therefore, each course has tractor drivers, greensmen, and a truck driver. The special crew consists of a truck driver, an irrigation specialist, and two chemical spray/heavy equipment operators.

**E**ACH COURSE is maintained by an assigned staff under the supervision of a foreman. They primarily mow the grass on the entire golf course, do the irrigation (36 holes manual systems and 18 automatic), and take care of raking

sand, changing cups, moving tee markers, and most routine maintenance jobs. Two persons on each course work a staggered work week, enabling us to perform the usual chores, plus the necessary work on weekends without incurring overtime.

The special crew takes care of larger special jobs, such as all the chemical applications, drainage work, topdressing, landscaping, fertilizing, renovating, etc. Additionally, they fill in on other course work when necessary, due to vacations, sickness, special tournaments and other reasons.

Thus with our 29 men, plus four non-working foremen, we are covered most of the time and can accomplish our objectives. During the winter we use eight men, and somewhere between eight and 29 men during the spring and fall.

Briefly, our schedule is: greens are mowed daily; tees, collars, approaches, and fairways are mowed three times weekly; roughs are mowed about one and one-third times in a 40-hour week.

When grass growth warrants, an extra mowing sometimes is needed each week. Fertilization is kept on the low side to provide acceptable color but not lush growth. Fungicides are applied every two weeks to greens, tees and aprons and monthly on fairways. Our weather usually requires that we make a few extra applications per season; thus, about ten fungicide sprays are applied to fairways annually. Weeds are sprayed as needed. Preemergent herbicides are applied to greens, tees and fairways for crabgrass control and are sometimes followed by a second application at one-half the normal rate. Greens are topdressed lightly every three to four



weeks from April to November. Greens are vertically mowed in two directions prior to each topdressing, and usually in one direction 10 to 14 days later. The contoured greens on The Greenbrier Course are mowed daily with 22-inch mowers and are brushed three to five times weekly, except during hot weather.

**COURSE RENOVATION:** During the spring, we schedule our renovation for a slack period in August and September. According to the golf anticipated, we close one course at a time for four days for three successive weeks. It takes three days to aerify tees, greens, and aprons, to aerify fairways in two directions, and to apply necessary amendments such as fertilizer, etc. On the fourth day we irrigate and clean up to make the course ready for play on the fifth day. Manpower from our other courses is used when necessary. Following this annual renovation, and while golfers are playing, we drill-seed all fairways. Roughs are aerified during early winter after most golf has ended.

We successfully completed marking all three courses in 1980. We plan to keep them marked — and check the out-of-bounds posts, lateral and regular water hazard stakes periodically. We were inspired to get this job done as a result of the talk we heard at St. Louis last year, "Marking the Course," by Joe Black, president of the Professional Golfers Association of America.

This is what we do and, to some extent, how we accomplish it. Our purpose is to offer every golfer the best possible playing conditions every day of the season.

Picture this typical scene: A guest enjoys lunch on the porch overlooking the golf complex in a setting where all three of our courses' first tees and 18th greens are located. In between are six beautifully manicured acres of practice range, featuring a large tee and a practice putting green. This panorama, dotted with greens, spotted with colored flags, six small practice greens bordered by white sand bunkers, and trees and shrubs in every view unfailingly draws him onto the first tee for golf.

**FROM THE FIRST TEE,** he notices that there is no trash, limbs, grass clippings or other debris to mar his view. Also, as he tees the ball, he is aware of the contoured fairway bordered by dense blue-green turf and bunkers with white sand that seem to beckon errant drives. As he addresses the ball,

he notices firm, close-cut turf, and over to the side, a large, sweeping bunker raked to perfection after the previous day's play. As he judges the shot to the green, some 175 yards away, he notices red stakes marking both sides of an open ditch to the right of the green. Also, to the left and behind the green, white stakes mark the boundary. He has to hit it straight! He firmly hits a 4-iron to the green. While replacing his divot, he observes other soil-filled divot holes with grass growing in them. He had seen the same thing on the tee — many divot scars containing a soil and seed mix. That was the reason the turf on the tee was so firm and had allowed him a good solid stance.

Approaching the green, he notices alternating light and dark green stripes over which his ball has to travel. The green is close-cut, blemish-free, and appears to be fast. As he studies the putt, he observes the slight undulations confronting him, and when he's ready to putt, he strokes the ball solidly. The ball rolls true, without bouncing, catches the lip of the cup and spins out three feet away. His par putt finds the middle of the hole and he is off to a pleasurable round of his favorite game!

**THIS IS WHAT** it is all about! Our constant effort is to produce a dense, tight turf, firm underfoot for good shot making. We want the turf to be some shade of green not as the result of fertilizer or water, but because of the natural growth of the variety itself and the height at which it is maintained. We strive to present a beautiful landscape free of man-made contaminants.

We want the tees, fairways and greens cut often enough to be free of clippings, to be firm of foot, and grass cut short enough so the ball can be played to perfection. Greens must be smooth, true and relatively fast. I believe the best speed at our course is 8 to 8½ feet measured with the USGA's stimp meter. Greens, in my opinion, can be too fast! We don't want our golfers to be slowed for any maintenance reason. We also want cart trails out of view but with easy access to landing areas. Hazards must be clearly marked so we know what Rule applies; there should be no surprises!

This is our goal at The Greenbrier, and these are the conditions we strive to furnish golfers daily. Quality playing conditions are not easily achieved. Quality turf is the result of a sound maintenance program based on proven agronomic principles, applied daily toward long-range objectives.

## New Green Section Office to be Established

Effective immediately, responsibility for providing Green Section services to USGA Member clubs in the states of Arizona, Idaho, Montana, Utah and Wyoming is being transferred from the Mid-Continent Region to the Western Region. All other regional assignments remain unchanged. This Western Sub-regional Office will be established in the Portland, Oregon, area and will serve USGA Member clubs in the northern sector of the newly expanded Western Region. Tim Ansett, currently Northeastern Region Agronomist, is being transferred and will assume his new duties at the Western Subregional Office on or before April 15, 1981.

Ansett lived in the Portland area before he joined the Green Section Staff. He has had several years of experience in dealing with turfgrass matters in several of the Western states.

## Special Announcement

All conference talks were recorded on standard cassette tapes. Those who wish to purchase talks in full as presented may do so from Eastern Audio Associates, Inc., Oakland Center, 8980 Route 180, Columbia, Maryland 21045.



# Effective Use of Our Natural Resources

by **MELVIN B. LUCAS, JR.**, Certified Golf Course Superintendent,  
President, Golf Course Superintendents Association of America,  
Golf Course Superintendent, Piping Rock Club, Long Island

**W**HEN YOU ARE about to waste anything, stop for a moment and consider the energy needed to produce it. It has been said that half the world could exist on what the other half wastes. No commodity illustrates this statement more than the most taken for granted commodity on earth — water. It is the most wasted, overused, and the most precious natural resource in many areas of the world.

While I was attending Penn State University, in 1961, Dr. Fred Grau cited the importance of water as described in the 1955 Yearbook of Agriculture, and he emphasized its usefulness in fine turf culture. His address had a great impact on many of us at that turf conference.

Since then many others have described the role that water plays in proper management of turf for golf. For example, in some of the proceedings of golf turf conferences held over the past few years, Dr. James Watson has addressed the critical water problems

we must face. Within the last few years many have come to agree with the water use ethic of Sandy Tatum, past President of the USGA, and with the arguments presented in numerous articles by Joe Dey that have appeared in *Golf Digest* on the overuse and waste of our most precious commodity.

During the recent drought in the Northeast, articles concerning the water shortage have appeared daily within the first three pages of the *New York Times*. Restaurants have stopped providing water at tables unless requested, and motels have requested that people conserve water during showers, etc. How we respond to these conservation measures will determine whether or not we experience the crisis of a water shortage.

It is interesting to note the remarks of the people who visit clubs of the stature of the National Golf Links of America, Shinnecock Hills, Maidstone, Winged Foot, Baltusrol, Pine Valley, Saucon Valley, and other courses that play so well. They comment on the firm,

fast greens and the tight fairways that allow the clubface to come in direct contact with the ball. The golf course superintendents at these clubs all describe the same type of management philosophy — “Try to keep it as dry and close cut as possible.”

Several years ago the Monterey Peninsula and Marin County, in California, were brought to their knees for lack of water, and in the Midwest many golf courses experienced water use restrictions. This year some of the courses in New Jersey were prohibited from using water on any turf areas. On Long Island a golf course was crippled because the well on that property was turned over to the city for its use.

How can we cope with this dilemma? Grants from various turf organizations, such as the GCSAA, USGA, state and regional turf foundations and chapters of the GCSAA, provide money to develop permanent grasses for drought tolerance. Through continued research, many improved turfgrass cultivars will be developed. Through research and

*Chicago Golf Club's bluegrass fairways are being replanted to an improved variety (A-34 Kentucky bluegrass) originally selected at this course. An example of natural resource use at its best.*





practical experience, several valuable lessons have been learned. Avoid overstimulating turfgrasses with nitrogen early in the spring, for they will grow when they are ready. Second, irrigation should be used only to keep the grass alive and to sustain adequate growth.

**F**OLLOWING IS the description of an experience I had involving irrigation and turf management. When I arrived at Garden City Golf Club 15 years ago, I was confronted with maintenance problems created by the overuse of water. Bunker facings near several greens eroded after every irrigation and were eventually refaced with grass. The utmost in discomfort to any golf course superintendent comes with the realization that the course is predominantly *Poa annua*. Annual bluegrass requires more water than permanent grasses, and the more you water it, the more it requires. This results in a never-ending management problem. I felt that 85 percent of the Garden City Golf Club turf was annual bluegrass, but as a result of a pump-house failure on July 4, 1966, my estimate proved to be on the low side.

On Long Island we are compelled to submit a meter reading each month to the Water Resources Commission. When I arrived at Garden City I called the Water Commission for past reports. The water use total for 1965 had been slightly over 55 million gallons. Reports from prior years showed that water use had increased each year after 1958, when a new irrigation system had been installed. By 1978, the number of gallons used for irrigation had been cut to 12 million, and even then I felt I was overwatering.

The ability of the superintendent to coordinate golfers' demands with agronomic needs will determine the success or failure of the golf course management program. In my experience as golf course superintendent, I have observed that golfer requests and complaints significantly influence the management of golf courses and the priorities of their superintendents. Some of the members' advice and comments have included:

"The greens don't hold, so give them a good soaking."

"Annual bluegrass is indigenous to this part of the country and no one will ever get rid of it. Let's not waste our money on *Poa* controls."

"We have our own well and the water is free and unlimited, so why not use it? Doesn't more water mean greener grass?"

"We want everything green and lush to impress our guests."

"We were out this morning and we saw an area burned out on No. 7 fairway (you know, that high knoll in the drive zone), so why isn't the course being watered more? It's dying!"

"We saw the golf tournament on TV . . . what happened to our course? It just doesn't compare."

"Why do they (grounds crew) have to renovate during prime playing time in late August or early September? If they had better control of operations during the year, this wouldn't be necessary."

**H**OWEVER, to put all this in proper perspective, we must presume that if we overwater, the soil will often be filled to capacity and turfgrass root growth will be reduced. This will ultimately lead to soil breakdown, compaction, and annual bluegrass and weed invasion. Experiences around this country and Europe have shown me that annual bluegrass is indigenous to the fine turfgrass world, growing profusely on all continents. So why don't we just seed new courses to *Poa annua* rather than bentgrass? To do nothing about it means only disaster during hot spells of summer, not to mention the winter problems and inclement springs when *Poa annua* is the most severely injured species. Yes, for many clubs water is free, but in 1977 I calculated our electricity cost to be \$.0003 per gallon. That may seem reasonable until we consider that over 12,000,000 gallons were used. This cost more than \$3,600. Since 1977, the cost of electricity has tripled. With overwatering, we will of course need extra fertilizer, more chemicals to control disease and, naturally, more frequent mowing. Does the result of this vanity outweigh the added expense? Because of the attention given to the high dry spots on fairways, the fate of the entire course is in jeopardy. The amateur agronomist sees golf courses on television at their peak a few Sundays each year through the wonderful world of color. If equal attention is paid to the player and the quality of turf for that tournament, there is no question that our course doesn't stand up to that comparison. However, it sometimes is too bad that television doesn't come back weeks later to show the same course as it is prepared for regular membership play.

During the season we have all seen approaches to greens that are wet, soft and soggy with little grass and many

weeds. The greens are so wet that algae have turned them black, and disease, carried by surface water, has eradicated grass faster than a nonselective herbicide. When excess water has finally drowned all the turf, then out comes all machinery (the aerifiers, thatchers, slicers, spikers and, yes, even rototillers) to try to bring the golf course back. Requiring all this extra work of an already small crew, much of the normal everyday work is let go, making the course look even worse. The expense of all this unnecessary renovation, at an inconvenient time, certainly points out the folly of overwatering the course.

**T**HERE IS an old adage which states that it is easy to put water on but it is almost impossible to take it away. A rule of thumb used by many is to try to put back the same amount of water that was taken out the day before. Many superintendents play "Russian roulette" with nature during the summer. Water is not applied until the last hope of rain has faded for that night. Then the ultimate of management weapons, the automatic irrigation system, allows the superintendent to take every day as it comes. A cloudy, overcast day results in little or no water loss. A hot, humid day results in little water loss. Rain forestalls watering that day and possibly the next. Hot, dry days and those with cool or hot breezes tend to trigger the use of the water system at times of the day that raise the ire of the golfers. This is called syringing. What this does is to slow the evaporation-transpiration rate and thereby stop the plant from wilting.

Some superintendents have found that a dew syringe cycle used every morning for five minutes on each fairway head tends to keep the fairway turf in good shape for the day. This also applies to greens and tees, but the time must be increased slightly. The critical concern is that turf managers should not go into August with an overly wet soil.

Augusts in the New York metropolitan area are generally hot and humid and just bloody uncomfortable for man and, yes, grass. So, to give the turf half a chance, all our season's watering efforts should be geared for the dreaded months of July and August.

With the improper management and wasteful consumption of water by so many people, it is no surprise that there is a severe water shortage in many areas of our nation. We all must share the burden of conservation; if we do not, we will have only ourselves to blame if and when the well runs dry!



# Quality Playing Conditions and Priorities (A SUGGESTED GUIDE WHEN STARTING A NEW JOB)

by **EDWARD C. HORTON**, Certified Golf Course Superintendent,  
Westchester Country Club, Rye, New York

**H**ISTORY HAS shown that golf flourished initially on the natural hills and seaside turfs composed largely of bentgrasses and fescues. Mowing was accomplished by the close cropping of sheep. Certainly today's standards of maintenance have improved the quality of playing conditions over those early years.

However, continued improvement of playing conditions will require turf managers to recognize and give priority to the many tasks that need to be done to create good turf for golf. We all know the reason for each task and the way that they all should fit together, and we know it is our responsibility to see that the work is done. But, invariably, there are always more productive tasks for tomorrow than there is time to do them in, there are more opportunities than there are people to take care of them, and there are always day-to-day problems and crises that arise. Somehow these all have to be adjusted to the available time. In short, we have to set priorities!

As I was gathering thoughts on this subject, it occurred to me that I have an unusual opportunity that will probably not be available to me again for quite a while: that is, to review how I attempted to set priorities in this, my first year of a new job challenge. What follows, then, is my "Suggested Guide to Setting Priorities for Quality Playing Conditions as Applied to the New Job."

## **PRIORITY No. 1: You, the Individual, Must Come First**

Charles Knight, Chief Executive Officer of Emerson Electric, noted in *Time* that "your health must come first; without that you have nothing. The family comes second and your business

comes third. You had better recognize and organize those first two, so that you can take care of the third."

This statement impressed me as very sound advice. Organizing your time can be a simple task, according to an article printed by GCSAA *Fore Front*. Your time could be organized on an appointment calendar using the following headings:

- a. work obligations
- b. social commitments
- c. individual responsibilities
- d. leisure activities

The system is simple and effective. It helps you see the priorities, and gives you a glimpse of how much time you are allotting to the different parts of your life.

## **PRIORITY No. 2: Your Employees Come Next**

I believe that there is something extra in all of our employees. Each one has hidden reserves of energy, talent and commitment. Good management is bringing out this vital spark in people, allowing them to think tall, daring them to dream and, in short, providing a supervisory climate for maximum productivity. With this in mind, try to develop the proper environment essential for harmony and maximum labor productiveness, suggested as follows by Dr. Jim Watson:

1. Build employee job satisfaction.
2. Provide development and growth chances for employees.
3. Treat employees with complete fairness.
4. Cultivate an atmosphere conducive to productive work.
5. Deal effectively with all complaints and grievances, regardless

of how insignificant they may seem.

6. Protect employees' physical well-being.
7. Develop employees through training.
8. Promote upward communication.
9. Promote downward communication.
10. Take a personal interest in the employee.

## **PRIORITY No. 3: Review First Impression Areas**

As quickly as possible, clean up and organize the office, the equipment repair shop, storage areas and the general environs of the maintenance facility. Look through the clubhouse windows to examine the club entrance drives, the parking lots, the landscaping of the clubhouse, pool, tennis courts, etc., and promptly correct negative first impressions where possible. This cleanup phase will begin to instill pride and better working habits in your employees and will help to establish support from club members and your employer as you begin to focus your attention on the playing conditions of the golf course.

## **PRIORITY No. 4: Obtain Area Measurement and Supply Inventories**

Measure and record areas established to greens, tees, fairways, bunkers, roughs, nurseries, and lawns. This analysis of the specific areas will enable the accurate forecastings of the need for fertilizers, chemicals, equipment and labor requirements for your projected maintenance programs.

Account for all operational materials such as chemicals, tools, equipment, mechanic's tools, grounds supplies and golf course accessories. In so doing,





*Cleaning and making the clubhouse entrance attractive should be one of your first priorities, Bellevue Country Club, New York.*

efficient methods of purchasing can be used to overcome surpluses, and deficiencies can be noted for replacement before needed. Time can also be reduced in searching for certain misplaced items.

**PRIORITY No. 5: Develop a Jobs-to-Do List**

Walk the course and list obvious deficiencies requiring your staff's attention. Attempt to assign priorities to these tasks. Pay attention to details. Getting the facts at this stage will be a key to making a good decision at a later time. Don't waste your time worrying about things you cannot do anything about. Don't try to fix things that are

impossible. Concentrate on jobs that are possible and delight in crossing them off the list as they are performed.

**PRIORITY No. 6: Schedule for Success**

The GCSAA's *Fore Front* aptly pointed out that "effective scheduling of employee tasks can make the difference between a department that runs like clockwork and one that always seems to be in crisis. Schedules and deadlines give urgency to activities that, without pressure, might pile up until a time when everything must be done at once." Develop a routine maintenance schedule on a seasonal, weekly and daily basis. "At the end of each work day, schedule the next day's activities —

phone calls, meetings, interviews and projects. Make a list, with the most important to be accomplished at the top. As other important things come up, you may have to change your plans, but having a list can help you keep your priorities in mind."

**PRIORITY No. 7: Set Up Standards**

Set and demand standards of excellence. Anybody who accepts mediocrity — in school, on the job, or in life — compromises, and when the leader compromises, the whole organization compromises.

Bill Buchanan, USGA Green Section Agronomist, has pointed out that "the superintendent is the one person in the





day-to-day operation of the golf course who can influence the game by his philosophy of golf course maintenance." He urges that we develop and maintain standards that place "greater demands on golf course playability and, in effect, that we help to protect the integrity of the game of golf." Often, in our desire to produce vigorous and healthy turfgrass with a pleasing natural green color we will be inclined to compromise true quality playing conditions for improved aesthetics in response to member pressures. So, review your maintenance programs, both current and basic, and adjust the standards to fit your individual clubs. Jim Watson suggests the following three factors for

review in the development of quality playing surfaces:

1. *Turfgrass selection* — species must be adapted to the climate and environment and suitable for golf.
2. *Soil* — must be adequate to support the growth requirements of the grass selected and modified to meet the requirements of play and use.
3. *Cultural practices* — presented in outline form, they are:
  - a. *Watering* — how much, when and how applied.
  - b. *Fertilization* — based on soil testing, in accordance with growth, health and color needs.
  - c. *Cultivation* — aerify, spike, topdress as needed.
  - d. *Mowing* — height of cut definitions, frequency, selection of equipment.
  - e. *Programs to control pests, thatch and soil compaction.*
    1. Disease — identification and selection of appropriate controls.
    2. Insects — identification, life cycles and appropriate controls.
    3. Weeds — pre- or post-emergent controls at appropriate times.
    4. Thatch — prevention by mechanical, chemical or biological means.
    5. Soil compaction — traffic control, soil modification.

#### **PRIORITY No. 8: Coping With a Water Shortage**

The droughts experienced throughout the country over the past several years have helped to emphasize that most courses can do better than to grow a failure-prone turfgrass such as *Poa annua*. Dr. Engel, in his article entitled, "Friend or Foe," pointed out that the general turf maintenance program should be aimed at minimizing annual bluegrass because of its unreliability. Water could be conserved, suggested George R. Blake, by first cutting down on sprinkling time to "see how little irrigation you can get away with . . . adjust down until you begin to border on the lean side . . . that's where you will be favoring the good species over the less-desirable ones."

Dr. Jim Watson published an excellent article outlining an eight-point program that will help conserve water and reduce the need for irrigation, while the search is made for alternative sources. He suggests:

1. Establish watering priorities.

2. Alter irrigation practices.
3. Reduce, or avoid where possible, other causes of stress.
4. Alter mowing and cultivation practices.
5. Expand the use of mulch.
6. Erect wind barriers, especially where there are large expanses of open spaces.
7. Aggressively seek additional sources of water.
8. Experiment with anti-transpirants.

Dr. Jim Beard, in his book *Turfgrass Science*, gives the relative drought resistance of 22 turfgrasses. The bluegrasses, ryegrasses and bentgrasses all fall in the poor to medium range. If the saline tolerance characteristic of turfgrasses was improved, it would allow all of us to use water containing higher contents of salt.

More reliable water sources should be sought. Among the several possibilities are wells and ponds, collections of marginal water, rerouting of city storm drainage, roof-top cistern collectors and the most abundant and most often wasted water supply, treated sewage effluent. Desalinization of salt water is a workable alternative implemented at the Ocean Reef Development, in Key Largo, Florida.

Finally, increase irrigation efficiency. Remember, the objective of irrigation is to replace water used by evapotranspiration of the turf as infrequently as possible. Victor A. Gibeault, in the article "Preparing Turf to Survive a Drought," offered the following checklist:

1. Determine rooting depth.
2. Determine soil water holding capacity.
3. Be aware of daily evapotranspiration rate as affected by radiant energy, temperature, humidity and wind increases.
4. Study other factors such as rainfall, soil fertility, growing season, cutting heights and frequency which also influence water use.

Be sure that sprinklers are performing at top efficiency. Be aware of water usage by accounting for consumption.

In conclusion, tackle the tough problems. If you are to be truly successful in producing better playing conditions, it is not fair to delegate the tough problems to the man below you and have him take the brunt of making the hard decisions. As superintendents, we have to be deeply and personally involved in all of the challenging issues of club maintenance. Help determine policy and make every effort to set priorities for progress.



# Quality Playing Conditions



## and Budgeting

*A better quality turf may not be as expensive as you think.*

---

by **C. WILLIAM BLACK**, Certified Golf Course Superintendent,  
Manager, Greens and Grounds, Congressional Country Club, Bethesda, Maryland

**T**HE FIRST reaction of those who plan pursuit of quality golf turf may bring fears of an astronomical increase in the operating budget. This is not always so, especially if the current operating budget is realistic. Although any operation requires a significant amount of money for the maintenance of the golf course, many courses could economize if they would place more emphasis on developing a good playing surface and less on aesthetics.

Before deciding that the budget is inadequate, carefully examine present management methods. Significant strides in improving technical knowledge of the playing surface, such as the development of the USGA stimp meter, have been achieved in the past few years. These efforts must be continued, and more emphasis should be placed on conditioning the playing surface above all other considerations. You may be surprised to find that quality playing conditions can be maintained at reasonable cost.

Quality turf is not a soft, succulent, solid-green grass cover. Quite the contrary. Some people today care more

about how a course looks than how it plays. Past USGA President Frank Tatum once stated that the courses in this country are being designed and maintained in such a way that too much of the game is played in the air. As golf originated, and is still played on the links of Scotland, the player is required to calculate a good deal of bounce and roll while planning a shot. On some courses today, the game tends to be a matter of hitting the ball a precise distance through the air because of the assurance that it will stop reasonably close to where it first makes contact with the turf.

One practice which produces poor quality turf is excessive irrigation. Overwatering has been peculiar to golf in this country for a long time. As golf here came more and more to be played in the air, heavily watered courses became easily justified. Only a few years ago, believe it or not, managers and superintendents judged the standard of a course by the quantity of water the system could deliver in the shortest period of time. Golf became a game of play from one soft lie to another,

featuring soft greens that would hold almost any shot and could be putted with impunity because any putt, no matter how badly stroked, would not roll very far past the hole.

**T**O PRODUCE good playing surfaces we must reduce the amount of water applied and encourage the option of pitch and run in the game. Good players will then be rewarded for a well-played shot. Good players can stop a ball on a firm putting surface from a tight fairway lie. If the player mis-hits from the fairway or rough, he should not expect to be able to stop the ball on the putting surface. The course should reward only well-played shots.

Aside from less water, other items are important to providing quality playing conditions at reasonable cost. With modern-day labor-saving equipment, such as riding verticutters, spikers, and topdressers, most routine operations can be accomplished in less time and with less manpower than in the past. For example, a small boom sprayer mounted on the back of a vehicle driven across the green and teeing



ground will save time. One operator can spray more evenly and faster than two men using a gun and hose. Labor-saving equipment releases workers for other operations without increase in budget.

In most cases, consistent quality playing surfaces demand a schedule of frequent, light topdressings. Though an increase in the budget may be needed for this time, it is not overpowering because the amount of material required remains the same; it is merely applied more often. If applied with a pull-type broadcast spreader, it is surprising how fast light applications can be made.

Vertical mowing is also essential to a good putting surface. Vertical mowing controls grain. Vertical mowing reels that are attached to triplex mowers will substantially reduce the time required when compared to the single-unit verticutting or dethatching operations. A triplex unit can verticut greens in about the same time that it takes to mow with a triplex mower.

Similarly, labor savings can be realized by using one of the new riding-type aerifiers and spikers. In many cases two or three passes with these machines can be made over an area in less time

than it takes to go over the area one time with single-unit aerating machines.

**Q**UANTITY TURF on the fairways and tees is also required. One way to cut some of the costs of maintaining fairways is to reduce their width. In recent years more courses have developed contour mowing patterns that produce a curving rather than a straight line border between fairway and rough. If performed with care and good planning, contour mowing will challenge the good player without significantly affecting the higher handicapper. Maintain a wider landing zone for the high-handicap golfer and a narrower one for the low-handicap player. If fairway acreages are reduced, the costs of mowing, fertilizing and pesticide applications can be reduced. Try cross-cutting fairways on a slow day. It may take slightly longer, but it is worth the effort because of the improvement in the lie obtained. Also, mow when the grass is dry; wet grass does not mow as neatly. In summary, fairways should be closely and frequently mowed, lightly fed and sparingly watered. The principal objective is to provide a good playing surface, not to see how much hay can be produced.

Although tees normally have been maintained similar to greens, in some cases tees could be managed like fairways. Tees should be firm, closely cut and as level as possible. Tees should be large enough to comfortably accommodate the play they receive.

The rough is another area where some saving is possible. Roughs can be maintained at a higher height of cut and mowed only as needed. Rarely does anyone mow fairways back to the teeing surface anymore. An area of rough is often maintained for 75 to 100 yards from the front tee to the fairway, thereby reducing the number of acres needing more costly maintenance as fairway turf. Also, consideration should be given to growing the grass around bunkers to rough height. This will save hours of hand trimming.

Golfers want good-quality conditions, though many do not really know what they are. It is up to us as managers, superintendents and club officials to provide and encourage quality playing turf. If you need help, contact the USGA Green Section. Then initiate a program and budget plan that encourages quality conditions for all to enjoy.

## Citation of Performance Award Presentation

**A**N IMPORTANT feature of the Annual Green Section Conference is to honor superintendents who exhibit the ability to produce turf conditions judged to be of championship quality for USGA Championships played during the past year. The USGA and the GCSAA have an agreement on policy for presenting citation awards at this Annual Green Section Conference for several reasons, not the least of which is that both associations feel strongly that it is important that deserving superintendents be so honored at a function with large peer attendance. What could be more appropriate a gathering than this week's joint GCSAA and USGA Green Section conferences and an attendance that fully appreciates true turfgrass excellence for golf.

At this point GCSAA President Melvin B. Lucas, Jr., presented awards to five deserving superintendents for 1980 Championship performance as follows:

JOSEPH R. FLAHERTY, Certified Golf Course Superintendent, Baltusrol Golf Club, Springfield, New Jersey, site of the U.S. Open Championship;

SHERWOOD A. MOORE, Certified Golf Course Superintendent, Winged Foot Golf Club, Mamaroneck, New York, site of the U.S. Senior Open Championship;

DOUGLAS PETERSAN, Certified Golf Course Superintendent, Prairie Dunes Country Club, Hutchinson, Kansas,

site of the Women's Amateur Championship;

FRED REESE, Golf Course Superintendent, Virginia Hot Springs Golf and Tennis Club, Hot Springs, Virginia, site of the Senior Amateur Championship;

STEVE SEIBEL, Golf Course Superintendent, Edgewood Lake Tahoe Golf Course, Stateline, Nevada, site of the Amateur Public Links Championship.

Photograph by LARRY GOLDSMITH





# Designing Golf Challenges for Economy and Maintenance

by RICHARD M. PHELPS

President, American Society of Golf Course Architects,  
Evergreen, Colorado

**T**HE GOLF COURSE architect faces an extremely difficult task in the 1980s. He must strive to design challenging, beautiful, and fun-to-play golf courses while at the same time he must ensure that the facilities can be built and maintained at a reasonable cost. He must also ensure that slow play or difficult playing conditions will not drive golfers away. The golf course superintendent has indeed found himself in the same quandary. If we cannot find ways to reduce these costs and wastes of our resources, the game of golf and, therefore, our livelihood will be threatened.

We are all aware that the game as we know it today originated in Scotland and that the golfers of that time played on golf courses that were created by nature, not by men or machines. Roughs and hazards were truly serious trouble, while maintenance was negligible.

Once golf took root in America in the late 1800s, we began to change the game. Our golf is played on a manicured park, whereas the Scottish game is still played on natural links sites. I am not saying that our brand of golf is wrong or that we should revert to the Scottish brand of golf overnight, but let's examine some factors which may *force* us to reverse our thinking toward the Scottish style of golf.

The American Society of Golf Course Architects has been very much concerned about the soaring costs of golf, the stagnation in growth of the game, the slow play, and the real threat that the energy crisis now poses. I would like to stimulate your thinking, not to advocate a sudden reversal in your design and maintenance procedures, but to discuss a few ideas.

To begin with, let's look at basic design. Course shapes, lengths and

strategies have changed over the years. Fairway layouts of Scottish courses, when reduced to drawings, offer multiple landing targets separated by devastating rough areas and hazards. We, however, have slowly modified this fairway so that it now is shaped like a banana. Some efforts have been made recently to alter the banana image and give it more of an aesthetic and strategic appeal — but not enough. Golfers have resisted changes to a more reasonable style of design and level of maintenance. Administrators have looked purely at the bottom line, and, for the most part, only the architect and the superintendent have wished for a return to a game of skill and daring as well as a chance to grow a tough, healthy breed of grass that has a reasonable chance to take care of itself.

All of us are aware of the gasoline shortage, and from all reports it appears that the situation is becoming worse. How are we to afford the fuel to maintain our golf courses in the future? Spraying, mowing, and fertilizing — all machines require gas engines of one size or another. Perhaps we should follow architect Pete Dye's example on the PGA Tour's Players Club, in Florida, and use goats to keep the grass from growing wild.

Water scarcity and priority of use is an experience that easterners seldom face, but at least half of the country is experiencing water shortages that could threaten the future of existing and proposed golf courses. We no longer can afford to continue to irrigate as recklessly as we do now. The time is already here in many parts of the country when the first priority for water is for human consumption, with agriculture and industry as second and third priorities. The use of potable

water for recreational purposes now is far down the priority list. Without effluent water for irrigation, golf courses would not exist in some parts of the country. We are currently in a western drought again which will undoubtedly have serious consequences to hundreds of golf courses.

**C**OLOR HAS BEEN the biggest threat to golf, and it will be a big threat in the years to come. Al Radko, National Director of the USGA Green Section, wrote an article in the August, 1977, issue of *GOLF JOURNAL* entitled, "Green Is Not Great." I hope all golf superintendents had the opportunity to read that article, and, more important, that the administrators, boards, managers, golfers and club professionals also read it. If we were to go on a concerted public education program pursuing that article's theme, I feel we could make substantial improvements in turf health and quality for golf. In addition, thousands of dollars in maintenance costs and precious water and fuel would be saved. The article pointed out that a lush, soft green grass is not a healthy condition. Turf maintained that way is highly susceptible to damage from diseases, insects and climatic extremes. Stop and consider how much easier your job would be if you weren't forced into early spring "green-up" through overwatering. Excess irrigation greatly influences problems with *Poa annua*, mowing, pesticide handling and application, which evokes adverse comment from every armchair expert at your club. Sure, it is going to take an enormous public relations campaign and there are some die-hards who may never go along with it, but we must find answers. Now is the time to begin looking.





*Courses in Scotland favor native plants for off-fairway cover. Gorse in flower.*

We must also develop new grasses and ground covers for our golf courses and parks through natural selection and breeding. We have been deluged with dozens of patented bluegrasses, perennial ryegrasses and other grasses over the past 10 to 15 years. This is excellent; however, I'm concerned that more research needs to be done in the area of drought and heat resistance. Presently, ads extol grasses for "dark green coloration," or "resists discoloration with early frost," rather than "has excellent texture and hardness under minimum irrigation," or "produces a dense cover with minimal fertilization," or "dwarf variety needs less mowing."

People in the field, as well as educators and researchers, *must* take the time to search for natural "ground covers" growing on your golf courses and around your communities that can take the place of the exotic grasses. Stan Metsker, past superintendent at the Boulder Country Club, in Boulder, Colorado, was responsible for bringing a high-quality alkali-grass into commercial production after he observed it

doing well on his golf course. He took the time to harvest and produce turf from the seed, reaffirmed its turf qualities and then passed it on to turf-grass researchers at Colorado State University. There *must* be superior natural clones of buffalograss, common bermuda, zoysia, ryegrass and other ground covers out there somewhere awaiting discovery.

Research must also continue on growth retardants and their use. We need to know more about application techniques and why minor discoloration seems to be slowing their use. We need to know more so that we can use them more and more efficiently.

Two articles on mowing patterns that I recommend to you appeared in the October, 1980, issue of *Golf Course Management* and in the May, 1980, issue of *Urban Land*. The former is my article and the latter was written by Joe Finger, who is also a golf course architect. Each of these articles provides ideas and illustrations of mowing patterns which could help alleviate some of the cost of maintenance.

**V**ARIED FAIRWAY patterns, rather than mowing constantly to the so-called "banana" shapes, can add tremendously to the challenge and beauty of your golf course. The average golf course now boasts of wall-to-wall green color and the golfer not only can't differentiate targets or differences in hazard, but he is hardly penalized no matter where he hits the ball — *THERE IS NO CHALLENGE*. On the other hand, select areas maintained as fairways sharpen the senses and skills of the golfer. He can *see* his intended target; therefore, he can plan his club selection according to his skill and the reward for having accomplished the shot precisely as planned is that much greater. In short, give golfers fairways that have aesthetic as well as strategic appeal. Select target fairway areas that will require skill, shot placement and daring, and mow them to reflect it.

The rough should be maintained at a reduced pace in terms of mowing, irrigation and fertilization. It should not be a wasteland of rock and knee-high weeds, but it should be "rough." This is



where *native* grasses, ground covers and other minimal maintenance natural plants are critical to budget. Too often in new construction, we, as architects, have been guilty of tearing up the entire site, thereby destroying all native cover. Then we try to reestablish a rough that is foreign to the site, and it either fails or it takes forever to establish. Such rough is costly to maintain.

In my view, as much as 35 percent of your maintenance costs can be saved by reducing your total area of fairway turf. By allowing the roughs to slowly revert back to select native grasses over a period of several seasons, we can still provide reasonable conditions for golf while we add revived interest and challenge at considerable savings.

A common tendency for administrators and club professionals is to think that the only way to improve the profit picture is to increase revenue by means of more golfers and faster play. They feel the best way to encourage faster play is to make it easy to find the ball, have no hazards and generally turn the golf course into "pasture pool" by

growing fairway turf over all the golf course. This approach seems logical, on the surface, but it doesn't take into consideration the labor, equipment, fertilizer, fuel, chemical and mowing costs involved. The fact is that capital and maintenance costs equal or exceed the added revenue realized.

Tees can be much more than the aircraft landing strips and boxes that were the rage in the 1950s and 1960s. A tee area should be natural and flowing. Their shapes, the various angles and distances from the tee to the landing zones, and their elevations can and should be varied and made more interesting. Even if you have a rectangular teeing area, you can add interest by modifying the mowing pattern on it.

A time-consuming practice in old-style tees was the need to stop and back-up constantly during the mowing operation. You can increase the tee area and maintain it for equal or less money if you study the problem. If the mower continuously moves forward in a smooth line, you can save time and gasoline. You also save wear and tear on



*(Above) Evergreens and rock formations create a spectacular natural setting for golf. Perry Park Country Club, Colorado.*



*(Left) Unique mowing patterns further enhance this beautiful landscape. Eagle Vail Golf Club, Colorado.*





hydraulic systems, gear boxes, and brakes by not constantly raising and lowering reels. The slopes of tees should be allowed to grow taller, since they are not in play. These are also excellent areas on which to use growth inhibitors, even if they slightly discolor or weaken the turf.

**D**ESIGN AND maintenance procedures have already changed to a great extent and will change somewhat more in the 1980s. We have seen much more use of power rakes over the past several years. However, if fuel costs increase, as they are projected to do, the mechanical sand rakes may become too expensive to purchase and maintain. The smooth, rounded edges of bunkers utilized in the designs of recent

years will revert back to bunkers of smaller size that can be hand raked efficiently. Currently, we are able to design large, flowing sand bunkers that are aesthetically pleasing so long as they allow for adequate turning radius and stability of the maintenance equipment on bunker faces.

There is nothing to prevent usage of more mounding and grass bunkering in place of sand bunkers. These areas should be maintained as rough and lend themselves to maintenance primarily with growth retardants.

If we must live with our current bunkers, there are ways to cut costs. The principal philosophy is to consider bunker areas as an integral part of the rough — not fairway. Edges then would be mowed less often, growth inhibitors

could be used and native grasses could be planted around them. Exploded sand then would be less a problem, since it would not come to rest on manicured turf. All mounds, whether around sand bunkers or standing alone, should be studied to see if a higher cut could be allowed on them. Mounds generally are droughty and are difficult to maintain. Higher cut grasses help shade the soil and reduce maintenance requirements.

To conclude, the pressure is on us to find ways and means to reduce maintenance costs; otherwise, in my opinion, we will all be out of jobs within the next 20 years. Perhaps you don't agree with me. I'm sure you have other ideas that will work just as well. Please pass them on to me and I will do my best to get the word out to our organization.



# Quality Playing Conditions and Proper Equipment

---

by **RICHARD H. EICHNER**, Certified Golf Course Superintendent,  
Superintendent, Los Angeles Country Club, Los Angeles, California

**I**N VIEW OF all the technical sophistication that has occurred, I believe we sometimes lose sight of basic facts that we might well be reminded of from time to time. While we all seek to achieve a sometimes elusive target, there is a comforting amount of single-mindedness toward this objective in a well-managed golf course. The best playing conditions are the result of foresight and ingenuity in using the resources we are allowed. Since the golf course superintendent is involved with the day-to-day conditioning of the course, he is rightfully entitled to be supported in his decisions as to amounts and types of equipment necessary to maintain the golf course. The fine GCSAA Equipment Show provides some feeling for the complexity and magnitude the superintendent must face in sorting out the individual products for purchase for his specific operation.

**Correct Equipment Selection:** We all have access to the same products, so there must be a reason why some golf course operations produce better playing conditions than others. In my view the acronym CARE helps define the needs — C = correct equipment selection; A = adequate operator training; R = regular equipment service; and E = extra attention to detail.

Having the right tool for the job is a major step in accomplishing the work required. If, for example, your membership demands that fairways be mowed five times weekly, you must select equipment that will mow all fairways in one day or less. If your course is very heavily played, you will have to mow fairways ahead of play in the morning or follow the last group in the evening. This will require more machines and

more operators. Frequent close mowing is required for quality turf. Perhaps with inflationary pressures and increasing energy costs our methods will change, but for the present, sufficient attention must be directed to the need for considerable mowing and the equipment necessary to provide a quality playing surface. As for putting green equipment, the triplex mower has been both a boon and a nemesis to quality surfaces. On the one hand it has made daily mowing affordable on many courses that otherwise could not afford such luxury, while on the other hand the triplex mower has been accepted by many as an equal substitute for the single-unit mower. In spite of the many improvements in performance coaxed from the triplex mowers, I believe you will find that the truly memorable putting greens you've played will be those cut with the single-unit mower rather than with the triplex. If you strive for quality surfaces, you must include single-unit mowers in your program.

**Adequate Operator Training:** Any machine is useless without a properly trained operator. Manufacturers and distributors are happy to provide worker instruction and training programs for you. They want to see their equipment operating well, too. Insist upon this service; it will help you obtain maximum performance from machines and operators. It will also minimize liability if the operator is trained. In addition, manufacturers display their equipment at field days and turfgrass conferences. Several company representatives are present at these affairs to explain and show how to operate their equipment. Some conduct clinics that are extremely valuable in ensuring that you get the best out of every machine and operator.

**Regular Equipment Service:** Service is essential to effective utilization of all machines, especially power equipment. This requires close cooperation between operators and the mechanic and his staff. It is important to report irregularities before they become a serious problem in down time. A good golf course operation features a preventive maintenance program, not one of continuous major repair and rebuilding. Regular and faithful equipment service is essential to quality turf. Admittedly, it is tedious and least glamorous of a good management program, and superintendents everywhere will attest to the difficulty they have in finding a good mechanic. It takes a special sort of man to be effective in this job. Equipment continues to become more sophisticated and complex. OSHA regulations must be observed and the many safety devices and requirements that OSHA has promulgated must be maintained in order to avoid the strong sanctions possible under the OSHA regulations. The mechanic must be part technician and part witch-doctor, and have a concern for and a pride in his work.

The key duties are tedious and repetitive. He must be able to muster the same concern for seeing that the work is done properly the 30th time the same greens mower is lapped as he does for the first. When he calibrates sprayers, close is not good enough for applying a number of modern turf herbicides without the danger of turf injury. All of the manual equipment used on golf courses must be adjusted, sharpened, lubricated, painted and properly stored. Parts and supplies must be ordered and stored for times when they are needed, and sources of specialty items must be located from time to time. All of this responsibility



is within the province of the mechanic. He must have a fairly large resource of tools to do the job properly. His time is valuable, and he is generally among the highest-paid employees; therefore, it makes good sense to see that his shop is properly equipped and is a comfortable place for work. Set down on paper, the cost of an adequate set of tools, hoists, grinders, work benches, and other equipment of this nature adds up to thousands of dollars. These costs are easily justified and have modest impact when they are figured in terms of the club's total expenditure and the necessity of the services they provide.

Because of the premium placed upon the mechanic's time, it is essential to train the individual operators to perform the routine daily adjustments on

the equipment to which they are assigned. This makes good sense in that it allows the mechanic more time for specialty jobs, and it also gets the operator more involved with his tractor or mower. As a result, it will be treated with greater care. One should be aware, however, of the occasional overzealous operator who will want to maintain the equipment beyond his abilities, so his responsibilities should be clearly explained, well understood and enforced.

**Extra Attention to Detail:** The difference between an adequate and an excellent job in course preparation has to do in large part to the attention given to many small details — the attention of the operator to the

machine's performance and condition, the reporting of small irregularities he detects in the machine before they become extensive. He is responsible for reporting these defects to the person responsible for seeing that they are repaired. The operator of hydraulic equipment must be especially vigilant because of the disastrous results of hydraulic oil spills.

Thoroughness and attention to detail by the mechanic and maintenance staff are necessary for the proper functioning of virtually all pieces of power equipment. Whether the mower cuts properly or not is measured by the thickness of a page of the telephone book. The difference between average and superb quality maintenance is often measured in a few thousandths of an inch.

*Having the right tool for the job is a major step in accomplishing the work required.*





# Experiences from The Field and Quality Playing Conditions

## Sand Bunkers

by STANLEY J. ZONTEK  
North-Central Manager, USGA Green Section

**T**HE RULES OF GOLF define a bunker as "an area of bare ground, often a depression, which is usually covered with sand." This definition projects the image of the old Scottish bunkers, or even those at the Pine Valley Golf Club, in Clementon, New Jersey. Sand bunkers are an important asset of any golf course because they affect its appearance, strategy, playability, and character. For a quality course you must have sand bunkers which reflect care in original placement, construction, and maintenance.

What makes a good-quality sand bunker? First and foremost, good sand. The September, 1974, issue of the USGA GREEN SECTION RECORD contained an article that presented golf course sand particle size specifications. Included in these specifications are guidelines for bunker sands. Briefly, the recommended size range for the majority of the particles is from .25 mm to 1.0 mm. Some finer sand is allowable, but the percentages of these particles should be kept to a minimum. Silt and clay content should be negligible, because bunker sand is normally washed sand. The coarse particles present a special problem because they tend to remain on the turf surface when they are sprayed onto the green by an explosion shot. They affect the sharpness of the reels and bedknives on mowing equipment, and they cause players to continually pick, brush, or otherwise remove these particles from their line of putt. This slows play and increases equipment repair costs. Therefore, the finer sands, which coincidentally conform to our specifications for top-dressing sands, are generally preferred because they can be worked into the surface.

Of secondary importance is the color of the sand. Most golfers seem to prefer the white sands, but they are not universally available at reasonable

costs. Good-quality playing conditions require sands of the correct particle size range. Color is of secondary importance.

**SAND CONSISTENCY** is also important. Too often several different types of sands are used in golf course bunkers. The goal should be to have all sand bunkers, especially those around the greens, contain a sand composed of the same general range of particle sizes. This will help ensure that playing conditions will be consistent.

Extreme softness or fluffiness is a frequent complaint about bunker sands. This is a difficult characteristic to determine because so many factors are involved — how long the sand has been in the bunker, its particle size distribution, its depth, its moisture content, how often and how deeply it is raked, and the shape of the sand particles. These are just some of the factors that determine the softness of sand in bunkers. It is sufficient to say that reasonably firm sands are preferred. Hard, packed, wet sands contaminated by soil do not play well. Conversely, soft and fluffy sands in which a ball imbeds represent the other extreme.

An important consideration with respect to providing good sand bunkers is how well they are maintained. Unfortunately, maintaining sand bunkers in peak condition is not easy, nor is it economical. It takes work.

A revolution in sand bunker maintenance occurred with the introduction of the mechanical sand rake. This machine allows the operator to rake large areas of sand much more rapidly than he could by hand. This labor-saving feature is welcome unless the operator is more interested in speed than in quality performance. The best-maintained bunkers receive a combination of mechanical raking, which smooths the largest area of sand, followed by hand raking, particularly around the edges and on the steep slopes. On

many courses, this procedure is a compromise between the speed of the mechanical rake and the quality of hand raking. The result is a good-quality job accomplished within a reasonable period of time.

**OTHER FEATURES** of a good sand bunker maintenance program include periodic edging and weeding to remove undesirable vegetation and to define a clear edge for the hazard. This is important. There must be a well-defined edge so that the player will know when his ball rests in the hazard.

Maintaining a 3- to 4-inch lip on the bunker in the direction of play is recommended for bunkers near the putting surface. The goal is to deter the player from putting out of the hazard. Sand should be raked flush with the back and side edges of a bunker. Lips are not required on fairway bunkers.

Good drainage is essential for all areas of the golf course, and sand bunkers are no exception. Sometimes rainfall and irrigation water accumulate in sand bunkers because of their shape, depth, and location; therefore adequate subsurface drainage is especially important. Nothing is more aggravating to a player than to find his ball lying in water or very wet sand days after a rain. Quality playing conditions for bunkers require an effective drainage system.

**IN CONCLUSION**, there are two basic considerations in providing good-quality playing conditions for sand bunkers. First, the sand should conform to a recognized set of guidelines, and, secondly, meticulous maintenance of sand and the area surrounding the bunker is essential. Sand bunkers should add to the beauty, character, and playability of a golf course, not detract from it! Maintenance personnel at the best golf courses are constantly reminded of the special attention required to insure quality playing conditions from the sand bunkers.



# Overseeding Bermudagrass Greens

by JAMES B. MONCRIEF

Southeast Manager, USGA Green Section

**G**OLF COURSES using bermudagrass have a choice of overseeding for winter play. Overseeding is necessary where cold weather causes bermudagrass to go dormant or grow too slow to maintain a satisfactory putting surface throughout the winter. A wide selection of seed mixtures is available that provide excellent results. Only quality seed should be considered. The information on the seed label includes the variety, purity, weed content and percent germination. The amount of pure live seed is important and can mean the difference between a good or poor stand.

Several factors affect an early superior playing quality. Bermudagrasses are very competitive with cool-season seedlings if the overseeding is accomplished too early, while warm temperatures persist. The date of seeding can vary greatly from south to north where bermuda is used and greens are overseeded for winter play. Earlier overseeding will be completed by September 15 and there will be a 15- to 20-day difference in seeding dates from north to south about every 150 to 250 miles. From the Atlantic to west Oklahoma and Texas, the following general seeding dates are suggested. If a golf course is overseeded more than nine months, the use of bentgrass should be considered. Using east to west Interstate Highways as guidelines —

I-40 and south

September 15 to October 1

I-20 and south

October 1 to October 15

I-10 and south

October 15 to November 15

I-4 and south

November 15 to January 1

or no overseeding

Many fungicides are available to protect seedlings while they are becoming established and to assure a good putting surface. Throughout the winter season, stay on a preventive program to keep disease from becoming a problem. There should be enough material on inventory at all times for at least two sprayings.



*Bermudagrass putting green in process of being overseeded.*

Ryegrasses emerge readily and produce a smooth putting surface within three to five weeks, depending on the management of the green. The first cutting of new selections of perennial ryegrasses should be at about 5/16 to 3/8 inch. This will allow better root development. Gradually lower the cut to minimize irregular roll of the ball. Perennial ryegrasses are more cold tolerant, more disease resistant and make a finer putting surface than domestic annual ryegrass; however, there can be a variability in the putting

quality of the perennial ryegrasses dependent on the grooming practices.

There can be two transitions: during overseeding and during the spring and early summer, when the cool-season grass begins to die. Poor transition in the spring or early summer distracts the golfer. No disturbance of the putting surface is desirable. Properly groomed bermuda greens can be overseeded with minor disturbance to the putting surface. During overseeding, however, the seed should be worked down close to the soil for best germination.

## Soils of The Southwest

by DR. DOUGLAS T. HAWES

Mid-Continent Manager, USGA Green Section

**T**ECHNICALLY, most soils in Nevada, Arizona, New Mexico, and much of southern California are aridsols, soils with surface layers low in organic matter and, in the natural state, dry most of the year. Most of these soils contain layers of clay and calcium carbonate or gypsum. Calcium carbonate is most common, and it often forms a hard layer known locally as

caliche, similar to what is called limestone on the East Coast. Calcium carbonates are common in all soil horizons, often existing as a coating on grains of sand. Because aridsols have not been leached, they are high in all nutrients except nitrogen. Unless the pH has been lowered, the availability of phosphorus may be low, and iron will be severely tied up.



Salt accumulation may become a problem after a few years of irrigation on poorly drained soils. This happens because these soils are high in salts, causing runoff water, which eventually is used for irrigation, to be high in salts. Because the evaporation rate is high, the salts from the water and the salts from the soil have a tendency to accumulate in the surface layers. Much of the water used in the Southwest comes from wells. This subsurface water is often higher in salts than runoff water, but more importantly it is often high in sodium. Therefore, there is a greater need to use a little extra irrigation water occasionally to flush the sodium and other soluble salts from the root-zone.

Soils of the Southwest typically are thought of as being relatively young soils because they are not highly weathered. The sand and fine gravel particles in the soil generally are not smooth-edged or rounded as they are on the East and West Coasts. It is very difficult in this region to find sands that have most of their particles in the medium and fine sand fractions necessary to construct putting greens according to USGA specifications. Almost never is a sand found that is this well sorted in this region. Most sands in the area contain everything from gravel to silt, and they often contain too many particles in the very coarse and coarse sand fractions.

The soil pH typically exceeds 7 and runs up to the low 8s. A pH higher than 8 indicates the presence of significant amounts of sodium. Because of this high pH, iron and phosphorus are relatively unavailable to plants because they are generally tied up in insoluble calcium compounds. Acidifying the soil with sulfur or sulfur-containing materials helps make these nutrients available for plant growth and may substitute in part for applying iron as a nutrient. Acidifying the soil also tends to improve the soil's infiltration and percolation characteristics by dissolving some calcium carbonates, which otherwise accumulate on the outside of the sand grains and act as a plugging mechanism in these soils under low rainfall or irrigation with high-calcium waters.

**M**OST SOILS of the Southwest do not benefit from gypsum applications because of their already high calcium levels. However, it is not uncommon that greens constructed with a high sand content will benefit from applications of gypsum at the rate of 10 pounds per thousand square feet

monthly during the main season of heavy irrigation. The reason for this is that the gypsum modifies the irrigation water, particularly well water, which is often high in sodium. High concentrations of sodium can produce a layer 1½ to 2½ inches down in the soil profile which, in the summer, creates a stench caused by anaerobic respiration. In other words, because of poor soil structure, not enough oxygen enters the soil to satisfy all the microbes in the top two inches and all the aerobic (oxygen-needing) microbes below this level. A substantial amount of easily digestible organic matter in this area is then worked on by anaerobic organisms, causing a black, odorous condition to develop in the soil. Roots of creeping bentgrass and bermudagrass grow poorly, if at all, in this layer.

In Arizona particularly, but also in other parts of this region, the problems encountered with organic matter and sodium in the water bring about a reluctance to include organic matter in the mix when building greens. This is a subject on which more research is needed as it relates to specifications for putting greens. Some of this much-needed research, as it pertains to the USGA Green Section specifications for putting green construction, is currently under way at Texas A&M under the direction of Dr. Kirk Brown.

An excess of soluble salts is usually not a major problem in these soils, but should always be considered as a potential problem in the Southwest. Soils high in salts are often found in low areas where runoff waters accumulate. There can be lenses of salt buried in soils and these can occasionally cause a problem. Typically, the biggest problem is use of water, particularly subsurface water high in salts when it is used on soils that have poor internal drain-

age. Such conditions result in serious accumulations of salts, and they could reach the point where the cool-season grasses, even bermudagrass, have difficulty growing. Water quality, therefore, is a problem, but we are fortunate that turfgrasses can better utilize low-quality water than many other crops.

If creeping bentgrass is to be used on putting greens, an adequate percolation rate must be established. If the greens are constructed to USGA specifications, or constructed so they have similar percolation rates, it is possible to flush out excess salts regularly to prevent their accumulation. However, it is difficult in summer when night temperatures are hovering above 90 degrees and daytime temperatures are well above 100 degrees to consider overwatering greens to flush out the soluble salts. If this is done on greens with poor internal drainage, the roots will die because of the lack of a sufficient supply of oxygen to continue normal respiration. When the soil temperature is at 90 degrees, roots and microbes use up oxygen at a rapid rate. Thus, turf can be lost rather quickly, and superintendents with bentgrass greens find themselves walking a thin tightrope through the summer season. If the greens are mostly *Poa annua*, they walk an even thinner and more treacherous tightrope.

**I**N SUMMARY, soils of the Southwest are typically very fertile, and salts are not usually a problem. Where water quality is a problem and where calcium carbonate accumulations occur, sulfur and sulfur-containing materials can be used to reduce pH and increase the availability of iron and phosphorus for plant growth. Finally, good internal drainage is most critical to the successful growth of creeping bentgrass putting green turf in this part of the country.

*Typical Southwestern scene. Sand dunes of New Mexico.*





# Selective Mowing

by **WILLIAM G. BUCHANAN**  
Mid-Atlantic Manager, USGA Green Section



*Selective mowing, Waynesborough Country Club, Pennsylvania.*

**Q**UALITY PLAYING surfaces are essential if the standards of the game are to be preserved. The state of the economy has forced the golf course industry to take a hard look at what golf courses have become and how they are maintained. Aesthetics holds an equal or a higher place on the turf priority list as the playing quality. The feeling generally prevails that the darker green the grass color and the more precisely it is manicured, the better the quality of the golf course. Fortunately, some clubs hold to ideals that ensure both good playing quality and aesthetically pleasing playing surfaces. Their philosophy is that the grass color is not nearly as important as the ability of the turf plant to support the ball and to provide the best conditions for play.

Golf course managers today are beginning to realize that it may not be necessary to maintain quite as much fairway area; that rough that is mowed relatively short but irrigated less, fertilized less, and mowed less does not severely hamper playing conditions but

would help stabilize or even reduce maintenance costs. Golf course maintenance personnel are also realizing that playing quality can be improved by directing more effort into maintaining less fairway acreage.

Universities have been directing more effort into research directed toward determining how little irrigation and fertilizer is necessary to maintain a quality turf. The researchers are now coming up with numbers to show how various heights of cut affect maintenance requirements on grasses. This information can be very useful in maintaining rough areas and the clubhouse grounds. If the cost of maintaining these areas can be drastically reduced, more effort can be directed toward maintaining the critical areas of the golf course. We must not lose sight of the fact that specific heights of cut on fairways, tees, and putting surfaces are required for quality playing conditions.

Many golf courses have enlarged fairways in recent years under the guise of speeding play. The speed of play may be a valid point, but the expense

involved in maintaining an expanded fairway area is also a very important consideration. It is difficult to ignore the cost involved in maintaining fairways. Generally, the fairways are mowed at least twice as often as the rough, they are fertilized more heavily than the rough, and in most areas of the country, fairways are irrigated while roughs are not. The budget expenditure for materials, water, equipment, and labor can be significant. By reducing the fairway area to the golf course architect's original design, or reducing the original acreage without affecting the intended line of play, maintenance requirements can be significantly reduced while playability is enhanced.

Fairway widths and contours are dictated by terrain, the hole length, and the direction of play. Normally, a fairway width of 40 yards is considered average at private clubs. The 40-yard width would be necessary only in landing areas for the high-handicapped player. The remainder of the fairway could be narrowed to as little as 30 yards in the drive zone for low-handicap players, which is about the width of fairways on courses as they are set up for the U.S. Open. This is not to recommend that every fairway should be shaped like an hourglass, but to suggest that fairway contours can add interest and challenge to the golf course and at the same time reduce the area of intensively maintained turf.

**T**HE TYPE OF golf course, the calibre of play and demands of the players will affect the degree of rough maintenance. The severity of the rough will dictate the difficulty of the hole in many cases and will also affect the speed of play. The rough height of cut will be the most critical judgment the golf course superintendent and golf committee would have to make. A height of cut of 1½ inches with just about any turf variety will not affect the speed of play appreciably because the ball will be relatively easy to find. The economics of maintaining a rough at a height of at least 1½ inches is bound to be less than maintaining a fairway, if for no



other reason than mowing frequency is reduced from two to three times per week to once per week or less, depending on the time of the year and the growing conditions during the given period.

The type of golf course, the type of play, and the "image" of the golf course will dictate the height of cut in the rough. There are also courses that have areas that are presently manicured as

rough but are out of play for all but the wildest of shots. These areas are being closely studied for the amount of money that is required to maintain them, and on a number of courses they are being eliminated from the maintenance schedule. Others have gone to maintaining them on a limited schedule. If a golf course does not subscribe to the low-maintenance theory for the aesthetics of the area, consideration

should be given to the use of growth retardant materials on a limited basis.

Economic considerations are playing a bigger role in golf course maintenance each year. Everyone involved in course maintenance must be concerned, but everyone also has a responsibility to the game. By selective mowing, economic interests can be served without detracting from the integrity of the game, or the golf course.

# Topdressing

by **DONALD D. HOOS**,  
Western Manager, USGA Green Section

**D**URING THE PAST few years, the subject of topdressing has received a great deal of attention. One has only to review the proceedings of most major turf conferences conducted during the past four or five years to verify the controversy and ongoing debate surrounding this topic. What is debated most often is the type of material to be used for topdressing. Should it be sand only, or should it be a soil mix? What is not debated are the benefits received from a topdressing program.

Today's golfer is more demanding and generally more aware of the conditions that comprise championship golfing turf. Golfers want consistent putting greens that are fast and firm. To achieve these conditions, a combination of management programs must be carefully coordinated. The key to success in most cases is moderation and consistency — light and frequent vertical mowing, light fertilization to produce consistent growth, mowing as frequently as possible, moderate application of water, and light and frequent topdressings.

It is difficult to separate the different management practices when discussing the development of quality playing conditions. Each practice greatly influences the other. Topdressing definitely influences all the other practices. It is a major component in the development of championship golfing turf.

Among the many benefits of topdressing greens are:

1. Tighter, finer-textured turf
2. Less grain development
3. Better thatch control
4. Less disease

5. Better water infiltration
6. Less compaction

When properly accomplished, there is no doubt that topdressing can provide all of the benefits mentioned above.

Thirty years ago, turf managers would have said that the main reason to topdress is to smooth the surface. Today, the same people would list the reasons mentioned above. The truth, of course, is a combination of all of the above.

**T**OPDRESSING, if done on a light and frequent basis, greatly influences the breakdown of thatch. If quality putting greens are wanted, thatch must be at a level consistent with good playing conditions. A little bit is needed for cushion, resiliency, and to provide the proper holding qualities. Light applications of topdressing mixed with the thatch minimize excess buildup. The topdressing applications stimulate microbial activity that is responsible for the natural breakdown of the thatch material. Topdressing can be a major tool in managing thatch levels on greens.

In addition to the control of thatch, frequent light topdressings add new soil around the grass plant which covers stems and promotes new root and shoot development. This creates a tighter, finer-textured turf with less grain, which is essential to good-quality turf for golf.

If thatch is at an acceptable level and topdressing has separated the plant residues to prevent matting, other benefits are also realized. Better air and water exchange is possible. More efficient use of water is achieved. Fertilizer and other chemicals are in

more direct contact with the soil because of better infiltration. This can result in improved disease, insect and weed control.

On heavily trafficked greens, we see the additional benefit of alleviating compaction if greens are topdressed frequently. The topdressing material physically supports the grass plant and helps absorb the compacting forces.

**W**HEN CONSIDERING quality playing conditions, repeated topdressings to smooth the surface are, of course, a major benefit. Ball marks are filled, footprints are leveled, and damaged areas of turf are smoothed. More consistent year-around playing conditions result. With frequent topdressings, we see the golf ball hug the green tightly, and not bounce as it rolls toward the hole.

With today's power topdressing machines, a program of light and frequent applications of topdressing is not difficult or time-consuming. All 18 greens can easily be topdressed within a day's time. If topdressing material in a suitable particle size range is used, the particles easily infiltrate into the turf without noticeable disturbance to play. Mixtures or sands that conform to recommendations outlined in the November, 1977, USGA GREEN SECTION RECORD article "Topdressing Mixtures—The Green Section's Position" are recommended for use.

The long-term benefits of a topdressing program are undeniable. In the development of championship golfing turf, its advantages are obvious. In 1981, consider a program of frequent topdressing to improve your greens.





*All slopes were hydroseeded to establish plants that provide year-around color. Alyssum and nasturtium pictured.*

# The Challenge of Industry Hills

---

by **WILLIAM H. BENGEYFIELD**

Director of Golf Courses, Parks and Grounds Maintenance

**I**T IS A GREAT privilege for me to be on this first joint USGA Green Section and GCSAA program today. For the next few minutes, I would like to tell you not only about the Challenge of Industry Hills, but a challenge I believe we all face in the coming years. This audience is made up of diverse interests in the game — administrators, turfgrass managers, agronomists, manufacturers of equipment, professionals — indeed, the leadership of golf today. We are being challenged to do what is right and best for the game we all love.

Well, as many of you know, I have had the great good fortune of being a

member of the USGA Green Section Staff for 26 of the last 29 years. The 26 years were happy ones for me! I must warn you that I believe fervently in the work and the great good of the Green Section! It is a most unusual organization and no one has put it in better perspective than Herb Graffis when he wrote:

“There is no other organization in all of sports that has done more for the beauty, enjoyment and betterment of life in America than the USGA Green Section.”

That's a real tribute!

Why, then, would anyone give up a nice, warm, secure, prestigious job with the USGA for one in the combat zone of turfgrass management? The fellow must be crazy! I assure you, it was not heroics! But there were challenges at Industry Hills. There was an unequalled opportunity to become involved in an extraordinary undertaking in golf.

On a more personal level, there was another challenge. You know, if all you do is *talk* about a subject for 26 years and never actually experience the results yourself, you awake in the middle of the night and secretly wonder, “Does this really work?” You begin to



doubt your own words. Are the preachings of 26 years really on the right track?

I can remember having similar doubts when, as a recently graduated navigator during World War II, I started out on my first overseas flight to Hawaii in a B-25. I knew Hawaii was out there somewhere, and I felt reasonably competent in navigation, but could I really pull this off? It was a challenge! Happy to say, Diamondhead came up on the horizon at about the right time. And, by the same token, the Green Section's recommendations really do work! There is a great deal of satisfaction in such events.

Another challenge presented by Industry Hills was a long-held belief that the public fee golfer has been cheated over the years, that he deserves something better than mediocre or worse turfgrass conditions found on so many municipal and fee courses today. I believe the future of golf lies in public links play, in municipally or corporation owned courses. Surely the private club will always be with us, but who will deny its declining role? For the future well-being of the game, the public play sector must be encouraged, increased and improved. Here is a great opportunity for all of us in golf to make a contribution. Too many public-fee/municipal type golf operations need help in course conditioning and turfgrass management. Indeed, I have found that most golfers (whether public fee or private) are far more concerned with the playing qualities found on their home courses than "what's going on in the PGA Tour, major tournaments, in golf magazines or on the sports pages."

**O**UR CHALLENGE is to provide good playing conditions for all golfers, and especially to improve them for the public fee player.

Right from the start, there has been a genuine desire to develop and operate a first-class public facility at Industry Hills. I am sure there is an expectation for profit and at least a desire to break even financially at the earliest possible date, but the philosophy to this point has been to do things right and what is best for the game and the golf courses. We want to be the best in the country, and I have been given support to reach that goal.

Several years ago, The City of Industry, which is located approximately 20 miles southeast of Los Angeles, anticipated filling a 640-acre dump site within the city and planned the development of Industry Hills — a recreation and conference center. About four years and 60 million municipal bond dollars later, the project opened as a public facility in May, 1979. Since then, 36 holes of golf have opened for play with over eight miles of cart paths, nine lakes, a fully automatic and computerized irrigation system, 160 bunkers and a 150-foot fountain, computer controlled. It also has a two-decked practice driving range.

The three-story conference center itself is one of the most modern and well-equipped facilities of its kind in the world. From a magnificent golf library (second only to the USGA Golf House Library), to four restaurants, meeting rooms, a grand ballroom capable of serving over 1,100 guests —

exceptional golf shop, locker rooms, helicopter pad — and now the construction of an 11-story, 330-room hotel — Industry Hills has a future.

There is also a swim and tennis club with 17 lighted courts, an Olympic-size pool and adjacent warm-up pool. Work is already underway on an equestrian center capable of handling over 200 horses on more than 11 miles of bridle trails. We will have a 100-acre park with walking trails and picnic facilities.

At St. Andrews Station, the funicular railroad delivers golf carts from both the Eisenhower and the Zaharias courses to a snack bar that will take you back to the era of steam transportation. Winston Churchill's railroad car also awaits at the station.

In spite of four methane gas wells on the property, the site offers unbelievable views.

In spite of the intensive effort, we have surely missed perfection. But, at least the opportunity to move constantly in the right direction for golf has presented itself and we are trying to take every advantage of it.

**T**HERE HAVE BEEN many challenges at Industry Hills. The golf courses themselves were designed to be challenging and tough. Like them or not, no one can honestly say they lack interest and excitement! During construction, it was a constant challenge to keep abreast of the contractors and their maneuverings. It was a challenge to bring new grass into acceptable playing turf on 400 acres. It is a challenge to grow grass, trees and flowers on a dump site with methane gas wells in full production. It was, and still is, a challenge to develop an entirely new maintenance crew and to keep abreast of *their* maneuverings. It is a challenge to adjust to the life and tribulations of the golf course superintendent. To appreciate anew the toughest, most demanding and unpredictable job in all of golf.

Probably the greatest challenge of all is to provide a meeting place for this game. To develop a public facility which will meet Dr. Robert Forgan's definition of the game:

"Golf is a means of going into God's out-of-doors, getting close to nature, fresh air, exercise, a sweeping away of mental cobwebs, genuine recreation of tired tissues. Golf is a cure for care, an antidote for worry; it promotes not only physical health but moral force."

*Typical rough on both courses.*



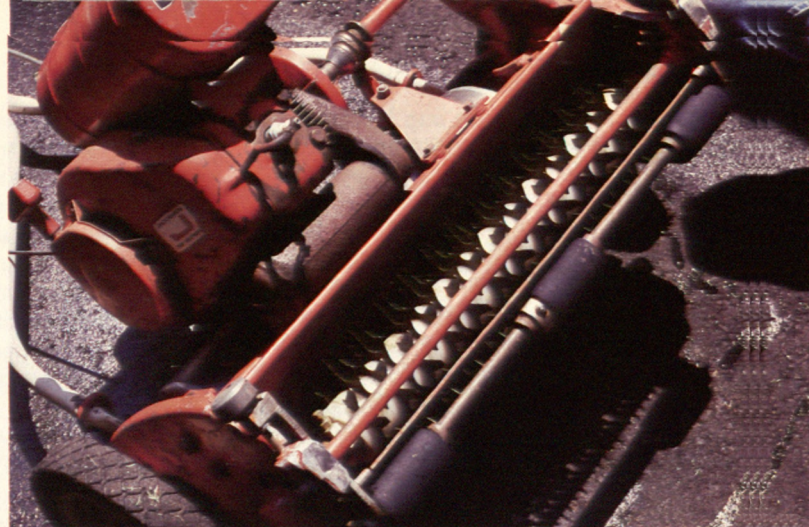


# Conditioning the Golf Course

## Grooming Greens for Play

by JAMES T. SNOW

Northeastern Senior Agronomist, USGA Green Section



*Vertical mowing reels can be used on triplex or single-unit mowers.*

**I**N THE OLD DAYS of golf course maintenance it was considered satisfactory if the "greenkeeper" could produce a reasonably healthy stand of turf throughout most of the golfing season. Today's golfers, however, demand much more than this, and it is up to the golf course superintendent to provide greens with consistently healthy turf and an excellent playing surface. A smooth, true putting surface requires constant grooming and the utilization of proper turfgrass management techniques if the most consistent results are to be achieved. Fortunately, the programs which are conducive to the maintenance of healthy turf will also promote the development of the best playing conditions.

The mower is the basic tool used in the maintenance of the greens, and the manner in which the mower is utilized and maintained will in large part determine the quality of the putting surface.

The putting green mower must always be kept properly adjusted. Each cutting unit should be carefully set and then checked routinely to ensure that this setting is maintained. The mower should be kept in good running condition, and the rollers and cutting units should be kept in proper alignment.

The need to maintain sharp edges on the cutting reel blades and bedknife cannot be overstated. Dull units produce a rough, leafy cut, and putting quality suffers. Reels should be back-lapped several times each month, especially when the greens are top-dressed frequently. Bedknives should be replaced several times during the season, depending on the frequency of the mowing, topdressing and aerating operations.

A number of accessories are available for the putting green mower which aid the superintendent in his efforts to groom the greens. When used routinely, they help reduce or prevent the buildup of grain and excess thatch. The easiest to use are the devices which can be permanently attached to the mower. Perhaps the best known is the Wiehle roller, a special grooved roller which is used in place of the traditional solid unit on the front of the mower.

Also available are accessory brushes, which can be mounted to the front of the mower and serve to fluff up the turf, especially the prostrate-type growth, before it is mowed. Another effective attachment is the comb, a device with metal or rubber teeth which project down into the turf and fluff it up before it is cut. The combs, brushes, and Wiehle rollers are all relatively inexpensive and should be used regularly for best results.

One of the most effective means of grooming greens is through regular vertical mowing, usually referred to as verticutting. It involves the use of specialized mowing units with vertically mounted blades, which cut down into the turf surface and remove excess top-growth and grain. The secret of this operation is to set the units so that they just nick the surface of the turf. Verticutting should be done several times each month, if possible, especially during the spring and fall when weather conditions are favorable. Vertical mowing units are available for both the triplex and single-unit putting green mowers.

**T**HE STANDARDS SET by each superintendent with respect to cutting height, mowing frequency and cup changing frequency will have an

important effect on the quality of the putting surface. Although a low cutting height is not essential for producing a well-groomed putting surface, other methods for reducing thatch and grain buildup will have to be practiced on a more frequent basis on greens cut at a quarter inch or higher. A 3/16-inch cutting height is usually recommended, except when other stresses may put the survival of the turf in jeopardy. Most superintendents who use both triplex and single-unit mowers find that the triplex units must be set slightly lower than the walk-behind models in order to obtain the same effective cutting height.

How frequently the greens are cut is another important consideration with respect to providing a consistently well-groomed playing surface. Only a program of frequent mowing will produce that fine putting quality desired by today's golfers. Mowing three or four times a week is really not enough, especially during the peak growing periods. Leafiness and grain tend to develop under this type of schedule. Most golf course superintendents find that they must mow five to seven times each week for best results.

Considering that the ultimate goal in golf is to put the ball into the hole, cup changing should receive special attention at every golf course, particularly with respect to technique, frequency and site selection. No green can be said to be groomed for play if this phase of the maintenance operation is neglected. Cups should be changed frequently enough so that "donuts" of wear injury do not form around each hole due to player traffic. This may require changing cups daily during periods of heavy play. Guidelines for



determining sites for cup locations are available from the USGA upon request.

**S**EVERAL TYPES of cultural programs are critical to the success of any effort made to develop a consistently true, smooth putting surface. Topdressing is well known for all the biological and chemical properties it contributes to turf, but it is also a major factor involved in the playability of that turf. Best results are obtained when light quantities ( $\frac{1}{4}$ - $\frac{1}{2}$  cubic yd./5,000 sq. ft.) of topdressing are applied on a regular basis, perhaps once per month or every three weeks. However, frequent topdressing is not necessarily a prerequisite to top-quality greens, especially when grooming techniques and other cultural programs are utilized in the most positive manner.

In terms of playability, best results are achieved with minimum use of fertilizer and water. In the spectrum of maintenance programs, at one extreme are the golf superintendents in cool season turfgrass regions who

use just slightly more than 1 lb. N/1,000 sq. ft./year and who do not turn on the irrigation system until late June or early July. At the other extreme are those superintendents who use 8-10 lbs. N/1,000 sq. ft./year and who begin irrigating their courses as soon as play begins in the spring.

A good average for fertilizer use on cool season turfgrass species is about  $\frac{1}{2}$  lb. N/1,000 sq. ft. per growing month. This figure may be adjusted up or down depending on many factors, including size of greens, turfgrass species involved, amount of play, types of soils, irrigation and precipitation rates, etc. In the past, fertilizer recommendations were based on the highest rate of fertilizer that would produce a response in terms of growth and appearance. Today, fertility programs should be geared toward using as little fertilizer as possible while still providing acceptable color and adequate growth. As far as playability is concerned, recent research has shown that as fertilizer rates increase, the speed of the greens decreases.

The speed and consistency of greens is greatly affected by water use practices. As a general guideline, putting green turf should be kept as dry and firm as possible while not putting the grass under undue stress. Maintaining a wet, lush turf provides an inferior playing surface by reducing green speed, increasing soil compaction and producing greater wear injury, especially in the vicinity of the hole. Any temptation to irrigate because of players' claims that the greens are hard should be avoided. Hard greens are improved by aerification and the use of an appropriate topdressing material, not by overwatering.

Grooming greens to play their best is one of the most important duties of the golf course superintendent. By properly using and maintaining his greens mowers, setting high standards with respect to routine maintenance operations, and utilizing topdressing, fertilization and irrigation programs in a positive manner, the golf course superintendent can provide a reasonably fast, consistently smooth and true playing surface for the golfers at his course.

## Fertility - Using Lower Levels Of Nitrogen

by **TIMOTHY G. ANSETT**

Agronomist, Western Region, USGA Green Section

**O**NE OF THE most important decisions a superintendent must make is the determination of the rate and frequency of fertilizer applications to putting greens. Although other nutrients are also essential and cannot be overlooked, nitrogen is the most critical nutrient in terms of its effect on the management and playability of bentgrass putting surfaces.

Because of its critical importance, one might expect that a high degree of agreement among turf professionals would exist with regard to the appropriate rate, frequency and timing of nitrogen applications. Actually, the contrary is true; there are many and varied ideas and opinions on this subject. Many of the differences of opinion are the result of the varying climatic conditions, management practices, and amount of traffic bentgrass greens are subjected to. However, another explanation for the lack of agreement may be the result of different interpretations of the response of bentgrass to nitrogen applications.

Nitrogen is often used in an effort to stimulate growth and color in bentgrasses. Research and field experiences have shown that bentgrasses certainly do exhibit growth and color responses to nitrogen applications, even when the existing nitrogen fertility level is high. Controlling growth and color through nitrogen applications can be an effective turf management practice. Too much importance should not be placed on growth and color, however.

Growth is definitely needed to maintain a fine putting green. It assures adequate density, promotes the healing of ball marks and worn areas around previous cup locations, and allows regular mowing to restore a high-quality surface. But as growth exceeds an optimum rate, the additional growth is no longer needed and is undesirable for several reasons. These include a greater tendency toward thatch accumulation, a reduced tolerance to stress, and an increased need for water. Certainly good color is a desirable characteristic, but it is definitely not critical

to the playing quality of greens. From the maintenance viewpoint, therefore, it does not seem wise to force color with added nitrogen, because it also stimulates growth and creates other detrimental effects.

It seems that through the years, as the response of bentgrass to high nitrogen fertility levels was being discovered and investigated, a misconception developed. Its observed growth and color response to high nitrogen fertility levels has too often been interpreted as an indication that bentgrasses require a high nitrogen fertility level. There is no particular reason why response should be interpreted as a requirement for higher nitrogen fertility levels, but it is because of that interpretation that many have applied more nitrogen than the plant actually needs.

**I**N ADDITION to the agronomic problems associated with the excessive growth from high nitrogen fertility, additional problems are generated





*Handmade tee box serves the dual purpose of a trash receptacle and a tee marker. Onondaga Country Club, New York.*

which relate directly to playability. The leaf texture of bentgrasses becomes more coarse as nitrogen fertility levels increase, causing a corresponding reduction in putting speed. The excessive growth also creates a need for more frequent grooming and topdressing to reduce grain and encourage upright growth. Because the playing quality of greens is probably the most remembered and important characteristic of a golf course, this must not be taken lightly when nitrogen fertility levels are considered.

To summarize, nitrogen fertility has a great influence on agronomics as well as the playing quality of bentgrass putting greens, and excessive nitrogen fertility should be avoided. If the goal of a greens management program is simply to maintain a high-quality putting surface, as is often the requirement, only limited amounts of nitrogen may be required.

As to how to determine whether excessive nitrogen is being used in a greens management program, the following statements may provide an answer. It is logical to assume that if an attempt has not been made to find the least amount of nitrogen required in any given situation, it is possible that too much nitrogen is being used. If the use of a lower nitrogen fertility level has never been tried to study its effectiveness, how can it be known that it will not be effective? As a progressively lower nitrogen fertility level is used on a trial basis, only then can the lower limit eventually be revealed. There are several ways to reduce the nitrogen fertility level, but the most successful method may be to significantly reduce the amount used in each application while slightly increasing the frequency of application. Remember that it is always possible to add nitrogen when it is really needed, but when it is applied in excess, it cannot be removed, and its effect must be tolerated.

# Little Things That Count

by **WILLIAM S. BREWER, JR.**

Senior Agronomist, Northeastern Region, USGA Green Section

**T**HE PURPOSE of my few minutes here with you today is mainly to announce, with permission from the editor, the initiation of a new feature in the USGA GREEN SECTION RECORD and to provide some examples of the material which we plan to present in the future.

The title of this presentation, "Little Things That Count," is not necessarily the one that will be adopted for this new feature. That decision has not yet been made, but it is illustrative of both the sort of material that will be published and of our reasoning for making this addition to the existing RECORD format. We will feature ideas related to golf course management that can be adequately described and illustrated in a small amount of space and yet are ideas that have been found to be decidedly helpful for resolving problems encountered by many golf facilities around the country. It is our hope that by so highlighting these Little Things That Count, we can greatly increase both the range and speed of circulation of some of these marvelous gems of inventiveness, most of them attributable to golf course superintendents from the clubs which we visit in the course of conducting our Turf Advisory Service. What we hope to accomplish, in short, is to make good news travel faster.

Here then are our first three Little Things That Count:

**1.** 150-yard markers present some problems for most golf courses. Golfers generally expect to see them on courses, and they appreciate them. But artificial markers interfere with smooth maintenance operations, not to mention their vulnerability to accidental or intentional removal. So the trend has been toward the establishment of some kind of shrub or tree, often one on either side of the fairway. This practice, unfortunately, has not been an unqualified success. Too often these natural markers are as much an interference to maintenance operations as the artificial ones. In

addition, they are very often placed where they can readily become unintentional golf obstructions as well. And — although aesthetic considerations certainly can vary widely — in most cases the plants chosen to function as 150-yard markers are selected precisely because they do not fit naturally into the course landscape.

This then is the dilemma: golfers want 150-yard markers, but the darn things are either a nuisance or else they stick out like sore thumbs, or both. What to do? Well, this idea might be just the thing for courses that have cart paths. Paint a broad white line across the path at the 150-yard point and angle it as needed so that the imaginary extension of that line across the fairway covers all the points 150 yards from the middle of the green. With this method there are no obstructions added to either maintenance or play, and there is little if any visual disruption of the landscape above and beyond that already caused by the pathway itself. This idea was photographed at the Colonia Country Club, in Colonia, New Jersey, several years ago and was, I believe, the inspiration of the superintendent at that time, Angelo Petraglia.

**2.** There is a whole class of objects — small ones — that can represent a very significant problem for most golf courses. Not only do shoe spikes and tees and cigarette butts and the like detract from the neat, clean appearance we would all like to have on our golf courses, but they also frequently cause damage to mowing machinery. Again, what to do? All courses have trash receptacles located at points over the entire layout, but that seems not to be enough. Well, consider this idea, passed on to us by the Onondaga Country Club, in Syracuse, New York, an idea one of the members picked up while vacationing in Florida. It is a simple, 4-inch square wooden tee box with a bottom spike or two substituted for one of the regular tee markers. What it does is provide a much more con-



venient receptacle for broken tees and such, encouraging the golfers to take a more active role in the proper upkeep of the course. We were told that after several weeks of use on the men's tees only, the women golfers were asking that a set be made up for their tees as well, and that a new enthusiasm for maintaining course neatness in all areas had been generated among the membership. An additional benefit too is that on par-3 holes one always knows where to find a broken peg for teeing it up.

3. The third and final idea of this sequence involves the very pervasive traffic-related problems created by golf carts. Unlike the two previous ideas, this one is already catching on rather widely, at least in the Northeast. This is an idea to remedy wear and soil compaction problems. It involves a simple solid white line of marking paint used instead of signs or ropes for indicating to golf cart operators those areas where they should not drive. This line is painted 30 yards or so out from the entrance to a green. This traffic control method seems immediately to become extremely effective, apparently because of the similarity to highway markings. Clearly traffic damage is not eliminated, but it is pushed back away from areas which most often come into play. Of course as the lines fade and need to be put down again, they can be drawn in somewhat different places to better distribute the traffic, and the worn areas can be renovated periodically as well.

Well, there you have it, our kick-off edition of Little Things That Count: lines on cart paths as 150-yard markers, tee boxes for discarding small objects, and painted lines as a traffic-control device.

We hope that these ideas will prove their worth on other courses, just as they have on those shown. We would also encourage anyone with an idea to share to contact one of our Green Section agronomists or to send in a brief description of the idea and a slide or two illustrating the problem and the solution. Remembering that old adage that if I give you a penny and you give me a penny neither of us has gained, but if I give you an idea and you give me an idea we are both enriched, let's all work together on this effort to share these little things that can count for all of us.

# The Stimpmeter - A Management Tool

by PATRICK M. O'BRIEN

Agronomist, Mid-Atlantic Region, USGA Green Section

**D**URING THE 1980 PGA Tour, there was a direct correlation between the leading money winners and their putting ability. Four of the five players with the lowest average number of putts per 18 holes finished among the top 10 money winners. In contrast, none of the five driving distance leaders finished higher than 44th on the money list. Outstanding putting, then, is essential to championship golf, and it is also essential that greens be of highest putting quality. One tool useful in maintaining a quality putting green is the USGA stimpmeter.

The USGA stimpmeter is an extruded aluminum bar, 36 inches long and 1¼ inches wide. It is a modification of the original stimpmeter, invented by Edward S. Stimpson in the mid-1930s to measure green speeds. The stimpmeter first came into wide use in 1976 and 1977 when eight USGA agronomists took over 1,500 stimpmeter readings on greens in 36 states. The stimpmeter was first used at USGA championships at the 1976 U.S. Open, at the Atlanta Athletic Club, in Atlanta, Georgia. At this Open, millions of golfers saw a stimpmeter demonstration on television by a USGA agronomist.

The green speed data collected in 1976 and 1977 by USGA agronomists was used to produce Green Speed Comparison Tables for regular membership play and tournament conditions. These tables are still used today. Unfortunately, these tables have been misinterpreted by many as an attempt by the USGA to standardize green speeds. The purpose of these tables is to encourage each club to decide upon a green speed desired by the membership, and then work towards reducing variability of speed between greens.

In February of 1978, public distribution of stimpmeters began to golf superintendents of member clubs who subscribed to the USGA Turfgrass

Advisory Service. Stimpmeters were available by the end of 1978 to all golf superintendents at a cost of \$15. By the end of 1980, over 1,800 stimpmeters had been mailed from Golf House. This figure indicates approximately 15 percent of the golf courses in the United States possess a stimpmeter.

**T**HE MAIN USE of the stimpmeter is to help the golf superintendent manage greens so that they putt uniformly over the entire course. The variability of ball speed between greens should be no greater than six inches when measured by the stimpmeter on fast greens for championship conditions. The variability would be less than six inches on greens with slower speeds.

Agronomic management practices performed by the golf superintendent have varying effects on ball speed. Wherever possible, similar management practices should be performed on all greens to reduce variability in ball speed. However, usually several greens on every golf course require unique practices that may influence ball speed. This may be caused by many factors, such as poor soil conditions, inadequate light and air quality, or pest problems. By monitoring the greens frequently with the stimpmeter, alternate management practices may be used to reduce any variability caused by these problems.

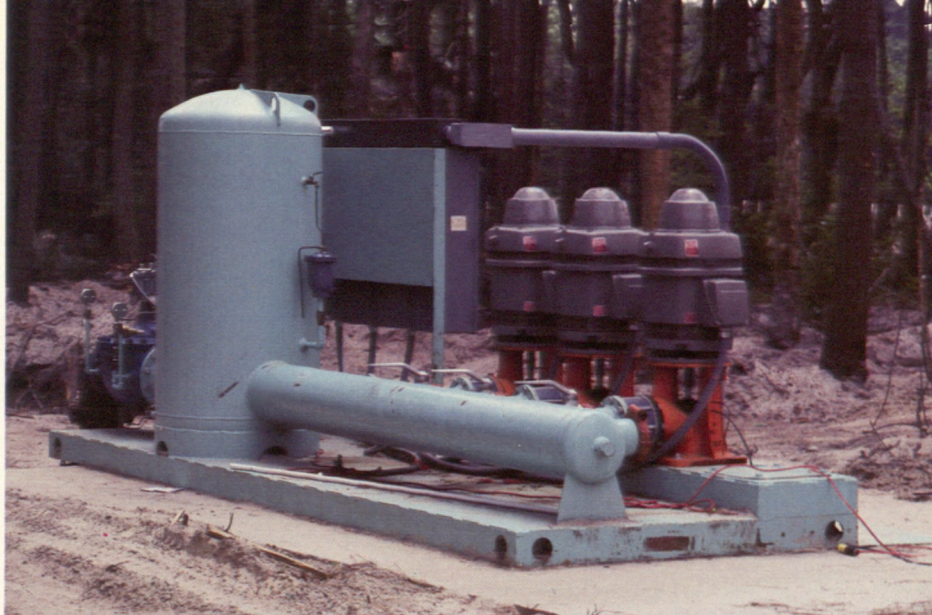
Sound management programs appear to encourage uniform medium to fast greens for regular membership play. Golfers usually prefer faster greens because they are generally truer greens. Light watering, minimum nitrogen fertilization, frequent vertical mowing to remove grain, light and frequent topdressing to smooth the surface and reduce thatch, and frequent mowing at 3/16 inch or less encourage quality putting conditions.

Since 1978, Dr. Ralph E. Engel, of Rutgers University, has studied the



effects of management practices on the ball speed of putting greens through the financial support of the Green Section. Studies of this nature will additionally assist the golf superintendent in determining the effect of his management practices on the roll of the ball.

It appears that the stimpmeter will be a valuable management tool for all golf courses. Coupled with sound agronomic practices, the stimpmeter can assist the golf superintendent in maintaining true, smooth, and consistent putting greens.



*Pump selection is important. Energy requirements differ for turbine vs. centrifugal vs. submersible pumps.*

## Water Use and Energy Conservation

by CHARLES B. WHITE

Agronomist, Southeastern Region, USGA Green Section

**W**ATER IS THE single most important factor for turfgrass growth, yet it has been stated that more turf is killed each year from overwatering than by all other management practices combined. Problems experienced last summer have brought water/turf relationships to the fore and have pointed out the tremendous water requirements of turfgrasses and the consequences that can result from mismanagement.

Since water is the primary growth factor for turfgrass plants, it follows that the irrigation system is the single most important tool on the golf course. The quality of the irrigation system and the pumping station will determine just how effectively the high water requirements of turfgrasses are met.

Pumping stations for golf courses are not only tremendous energy consumers, but they also usually operate during the peak hours of electrical demands. Several electrical co-ops in Georgia offer off-peak rates for electricity, which can save 50 percent of a club's electrical bill, or about \$3,000 to \$5,000 annually. The electric company installs a shut-off switch on the main pump, and when peak electric use occurs in the utility company's region, the pump is shut down. Peak loads are met about six to eight times a year, usually during July and August and

occurring about 1:30-4:00 p.m. Distributors can predict ahead of time when peaks will occur and will forewarn their customers. Jockey pumps need not be included in the peak-load shutdown program in order to take advantage of the savings, so even if irrigation or syringing must be done during a shutdown period, the jockey pumps can still be used. Experience shows that in most parts of the country syringing is best done from 10:30 a.m. to 2:30 p.m.

There are other means of conserving energy with our irrigation systems as well. The most basic is pumping station selection and installation. For example, do you know that turbine pumps are more energy efficient than centrifugal pumps, with submersible pumps being the least efficient? The setup and operation of the jockey pump is also important to consider. A jockey pump is 15-25 horsepower in power and is designed to maintain system pressure and to supply low gallonage demands. A jockey pump, however, should be set to cycle five times per hour or less. Remember that it requires 150 percent of operating energy demands to start a pump, so frequent cycling is very energy consuming, even wasteful. Many golf course personnel believe that a jockey pump is unnecessary and an added expense. While it is true that the large pumps can be used for both regular

irrigation and syringing, such constant use can significantly reduce the lifespan of the main pump and waste electricity at the same time. For example, a large pump may deliver 100 gpm, yet you wish to syringe a green with a delivery of 10 gpm. Though it might seem reasonable to expect that the pump would draw only 10 percent of the electricity to meet the 10 gpm demands, it actually draws 40 percent. Most will agree that this will add up to a significant expense over a year's time. Is your system as efficient as it could be?

**S**OME ENERGY-saving considerations, however, are not feasible for the golf course situation. Such is the case with pump size and selection. One 100 horsepower pump is more economical to operate than two 50 horsepower pumps. The risk of losing the single pump and forcing shutdown of the entire system is not worth this energy savings.

After considering these facts, one question should be foremost in the mind of every golf course superintendent: What can I do to upgrade my irrigation system to meet present-day standards? Consult with the experts and become aware of things you can do as a golf course manager to reduce energy consumption.



# TURF TWISTERS

---

## A DIFFERENT WORLD

**Question:** How do you increase the thatch layer in putting greens on a heavily played public golf course? (New York)

**Answer:** Public golf course maintenance is in a different world from country club maintenance. We agree that thatch is very difficult to produce on heavily played greens. Our recommendations are: (1) enlarge green size if at all possible to spread traffic; (2) utilize every square foot of practical pin space; (3) encourage bentgrass through management and overseeding; (4) thoroughly aerate all greens three to five times yearly (the new roots formed will help provide added resiliency); (5) use the upper safe limits when applying nitrogen; (6) topdress on a light, frequent schedule with quality material to provide new soil life and a new growing medium for existent grasses; and (7) close the course during inclement weather when traffic could be especially harmful to putting soils and surfaces.

## WITH BUILT-IN SAFETY

**Question:** When troubled with a difficult-to-control disease, is it advisable to increase the rate of application of fungicide recommended? (California)

**Answer:** THE ANSWER IS A RESOUNDING NO! For most fungicides, manufacturers build in a safety factor of two times the normal application rate. This, they emphasize, is to compensate for possible human error. Therefore, when applied at two times the recommended rate *no injury should occur to the plant*. But what about soil organisms? What about target (pathogenic) vs. non-target (non-pathogenic) organisms? Will the double rate upset their natural balance? THE ANSWER IS YES. If you encounter serious disease problems annually, examine your total management program first. Fungicides are helpful adjuncts to management and never should be relied upon as the mainstream program.

## WILL TAKE AN ACT OF CONGRESS

**Question:** We are told that it is helpful to raise the height of cut on putting greens during periods of heat stress in summer. What is your recommendation? (Connecticut)

**Answer:** For normal country club play, once your mower is set at a height desired by your membership . . . change it only by Act of Congress! If your grass continually becomes weakened in July and August, carefully examine and adjust your nitrogen rate, not the mower height! Raising the mower height causes more thatch buildup, increases the need for more aeration and vertical mowing, increases disease potential because of increased leaf mass, produces more grain in greens, increases leaf length, and therefore slows the pace of green speed and causes surfaces that are less than true to putt on, to say nothing of the perennial problem some golfers suffer on untrue surfaces — the dreaded Yips!

For courses that experience heavy play on greens, there is justification for raising the mower because the added leaf surface and resultant thatch increase should help decrease the rate of injury from traffic wear. In doing so, however, we recommend that the mower be raised in increments of 1/32 inch until a height that you can live with is determined. Rarely, if ever, should greens be mowed over a true 1/4 inch.