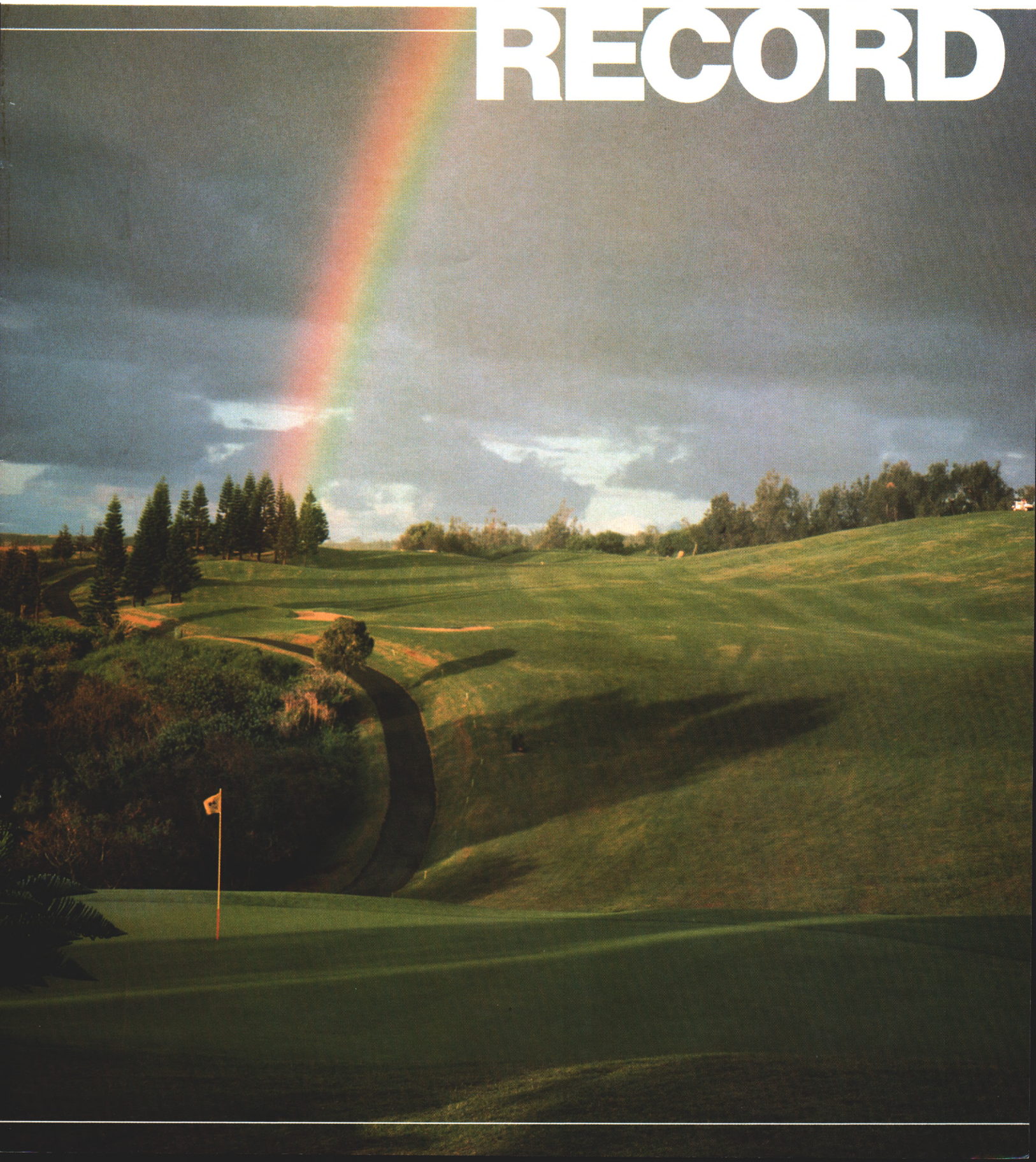


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Section Maintenance — It Could Be Your Pot of Gold!

by **LARRY W. GILHULY**

Director, Western Region, USGA Green Section

MR. JONES and Mr. Smith are playing their regular morning match to determine the daily bragging rights. Mr. Jones has the honor and promptly hits the first shot out of bounds since he has inadvertently aligned himself with the misaligned tee blocks. After stating a few expletives under his breath, his next shot splits the fairway perfectly. Mr. Smith slightly pulls his first shot toward the despised oak tree grove to the left. After nearly five minutes of searching, the ball is located in eight inches of tall grass at the base of a tree. He barely advances the ball sideways on his next stroke and finally returns to the fairway on his third shot next to Mr. Jones' ball.

Both players find the left greenside bunker in four. Unfortunately, they have

completely different shots, even though the balls are only separated by the length of a putter. Mr. Smith plays first and explodes with professional aplomb to within 18 inches of the hole. Mr. Jones takes the same swing, yet his club bounces on soil, having caught the ball thin as it wings its way into the neighboring property. His club follows at about the same trajectory!

Mr. Jones and Mr. Smith are fictitious players, yet day in and day out the problems they encountered on the first hole are faced by thousands of players on hundreds of golf courses across the country. Misaligned tee blocks, excessively long grass near trees, and inconsistent bunker sand quality are three small examples of how a maintenance employee can affect a round

of golf. Inappropriate hole locations, poor bunker raking, indistinguishable bunker edges, over-irrigated greens, untended localized dry spots, heavily worn tees, and debris littered on the course are other examples that affect the play of the course and its appearance.

The question is, "What can be done to minimize the employee's negative impact while maximizing his/her positive output?" This answer is simple — training and organization.

There are many ways to develop a well-trained, organized, and motivated staff. For example, maintenance jobs can be divided into specific classifications with very narrow responsibilities. In other cases, where the staff is small in number, employees must be versatile enough to perform all tasks

Tall grass in the wrong place can result in an unplayable lie, or worse.



within the maintenance operation. A third option, section maintenance, involves a combination of these methods and may be a good choice for many golf course maintenance operations.

Standard Maintenance Organization

Golf course maintenance budgets for 18 holes can range from well over \$1 million down to less than \$100,000 annually. Given this broad range, there is no single method of maintenance organization that is best for every operation. The larger-budgeted golf courses have the potential for immaculate conditions, yet many small-budgeted courses achieve very good results within a limited framework. How is this accomplished? Often, the answer is proper training, crew motivation, and good organizational skills — key factors that can make or break a golf course maintenance operation.

For the sake of comparison, the differences between a standard method of maintenance and section maintenance will be examined. Though section maintenance may not be well suited to every operation, the advantages make it well worth considering.

As a point of reference, let's assume a total staff size of 16 employees on an 18-hole golf course during the growing season. The course has a decent irrigation system, modern equipment, adequate drainage, proper tee size, and good putting surfaces — in other words, no major structural or capital projects that must be completed by maintenance personnel. The greens are moderately sized (5,000-6,000 square feet), and the bunkers are not excessively large or numerous. A maintenance staff in this situation might be divided into the following classifications:

- One golf course superintendent.
- One assistant superintendent.
- One mechanic.
- One irrigation specialist.
- Two fairway/rough mowers.
- Two tee/trim mowers.
- One bunker maintenance/utility worker.
- One course preparation/utility worker.
- Two greensmowers (triplex)/utility or four (walkers)/utility workers.
- Two or four other utility workers, depending on whether the greens are cut with triplex or walk-behind units.

Sixteen employees.

A clubhouse gardener is not included, as this requirement can vary from

course to course. The golf course superintendent, mechanic, irrigation specialist, fairway/rough mowers, and tee/trim mowers are well-defined positions that usually require a total weekly commitment to each area. The employees responsible for course preparation, mowing greens, and bunker maintenance join with the assistant golf course superintendent and utility employees to complete other operations such as chemical and fertilizer applications, topdressing, aerification, course cleanup work, vertical mowing, bunker sand replenishment and redistribution, hand-mowing work, minor construction, and other tasks as required.

In short, this method of maintenance encompasses the entire operation and can be quite effective. It is used at many golf courses throughout the country with success.

As an alternative, let's take a look at what some consider a more efficient method of maintenance organization, one that capitalizes on human requirements such as increased responsibility, competition, and motivation. Many golf course superintendents have found the section or zonal method of maintenance to be the most efficient method for their courses.

Section Maintenance Organization

Take the same number of workers (16) and reorganize them using the section concept. The staff could include:

- One golf course superintendent.
- One assistant superintendent.
- One mechanic.
- One irrigation specialist.
- Two fairway/rough mowers.
- Two tee/trim mowers.
- Five section personnel.
- Three utility personnel.

Sixteen employees.

The golf course superintendent, assistant superintendent, mechanic, irrigation specialist, fairway/rough mowers, tee/trim mowers, and utility employees do not change in regard to job requirements. The change occurs in the areas of greens mowing, bunker maintenance, and course preparation. Instead of the combination approach discussed previously, employees are assigned to specific holes or sections of the golf course.

A typical day for a section employee might include mowing greens, hand-raking bunkers, changing cups and tee blocks from a pre-scheduled chart, fill-

ing divots on tees, and cleaning trash receptacles on their assigned holes. Other tasks could include bunker edging, sand replenishment and distribution, hand rotary mowing, spot watering, and cart path edging. The section employee is also responsible for the maintenance and replacement of hole liners, flagsticks, ball washers, tee towels, benches, trash receptacles, and tee blocks. Finally, the section employee is usually assigned a specific vehicle for transportation, a putting green mower, a rotary mower, and all the smaller hand tools required for the job.

An initial look at this method of maintenance might suggest an excessive amount of work for each employee. Since the area covered is smaller than normal, however, and the daily tasks are completed while the employee is in the area, wasted time is greatly minimized. In terms of time management, this method of maintenance is very efficient.

Advantages of Section Maintenance

The section method of maintenance may not be ideal for every operation, but the advantages of the system are numerous and are worth noting:

1. Responsibility. It is normal for most employees to desire a reasonable amount of responsibility in their working environment. By assigning individual sections of the golf course to individual employees, the ultimate results are in their hands. Some employees respond enthusiastically and with dramatic results. Some continue at their current level of output, and others may not respond well. It is the golf course superintendent's responsibility, then, to fill these positions with the most qualified individuals.

2. Competition. Again, it is natural for anyone to respond to competition when placed in this situation. Most superintendents report a positive competitive atmosphere resulting from section maintenance programs. Indeed, many superintendents provide rewards for the best section, perhaps on a monthly basis, to further stimulate the competition.

3. Pride. Sometimes it is difficult to instill pride-of-workmanship in a golf course work environment. A nice salary increase or bonus can only go so far. A job can become boring if it involves the same repetitive procedures day in and day out. The section employee is busy with many different jobs, and he/she may not have time to become bored.



(Above left) Pride of "ownership" can be a powerful tool for motivating employees.

(Above) Walking greensmowers are well suited to the section method of maintenance.

(Left) Discussing maintenance in the field is far more effective than in the maintenance facility.

When he/she is given the responsibility or "ownership" of a certain portion of the golf course, pride-of-ownership is usually evident.

4. Motivation. Perhaps the greatest positive impact the superintendent will derive from section maintenance is in terms of motivation. What better way is there to motivate than using competition, internal pride, a feeling of "ownership," and added responsibility! Naturally, not all employees will respond to the same degree, but those who are self-starters will shine in this system.

5. Care of Equipment. One interesting aspect of section maintenance is the reported reduction in the breakdown of equipment and the loss and breakage of small tools. Again, when given the responsibility of using their "own" equipment, section personnel usually exercise greater care. This can lead to less downtime and more time for the course mechanic to work on other responsibilities.

6. Quality and Quantity of Work. By encouraging responsibility, competition, and motivation, a more productive employee usually emerges. Golf course

superintendents using this system note that one of the first benefits is attention to detail and improved condition of the bunkers. Some consider that the green is the main focal point of the golf course, and that the bunkers provide the framing. If your framing is not up to standards, this method of maintenance can work wonders.

7. Reduced Employee Turnover. Motivated employees who enjoy their responsibilities and take great pride in their work are less likely to leave for slightly higher pay. The feeling of belonging to a productive team can be

a powerful force in employee satisfaction.

8. Streamlined Operation. Employees don't have to wait in the morning for job assignments when they're accustomed to the section concept. This allows more time for the golf course superintendent and the assistant superintendent to provide direct supervision in the field.

9. Accountability. The previously mentioned benefits all focus on what the section method provides for the employee and the golf course. For the golf course superintendent, section maintenance provides a method of accountability for the most important areas of the course — the greens, green surrounds, bunkers, and tees. If an area is not quite right, there is no question about who is responsible. If an area is perfect, praise can be directed to the responsible person.

Disadvantages of Section Maintenance

There are many compelling reasons to consider section maintenance. As stated previously, however, this method of maintenance is not necessarily suited to every situation and does have some drawbacks. Following are a few of these drawbacks:

1. Extra Equipment. Converting to a section method of maintenance often requires more equipment. Each section employee should be equipped with a vehicle with the capacity to carry several

pieces of equipment or to tow a small trailer. Individual power edgers, string trimmers, rotary mowers, hoses, and smaller tools need to be assigned to each person.

2. Staff Size. For the sake of the preceding comparison, an arbitrary figure of 16 employees was used. Many smaller-budgeted golf courses cannot realistically achieve this staff size, and section maintenance may not be practical for them.

3. Weekend Maintenance. Due to budget considerations, many golf courses minimize expenditures by using triplex mowers on weekends. Just one hydraulic leak, however, can change a normal section employee into a "Section 8" if it occurs at the wrong time! Although it is more expensive, maintenance for greens on weekends should be similar to weekday programs. Remember, grass doesn't know the difference between Sunday and Wednesday — it can die at any time if it does not receive necessary care during time of stress.

4. Finding the "Complete" Section Employee. Not all section employees maintain their sections in exactly the same manner. For this reason, some golf course superintendents must alter plans to compensate for individual weaknesses. For example, certain employees may not understand the difference between disease and wilt, yet they are excellent at providing detail work. In

this case, the golf course superintendent may decide to have one or two employees hand-water greens. Another common modification of the system is to use a single person for course preparation since some employees do not play golf and may not understand proper hole location.

Getting Started

Comparing the advantages of this system to the disadvantages, the advantages are too numerous to overlook. If section maintenance fits into your operation, here are a few tips from superintendents experienced with the method:

Divide the course into tight geographical regions. Try to keep each section as small as possible to minimize travel time.

Do *not* establish a section that includes all the early holes. For example, try to avoid a section comprised of the practice putting green and holes 1, 2, and 3. This employee would suffer from player interference and greatly reduced efficiency. Instead, try to incorporate the early holes into two or more sections if at all possible.

Provide necessary individual equipment. Although more expensive, the benefits of equipment "ownership" cannot be overlooked.

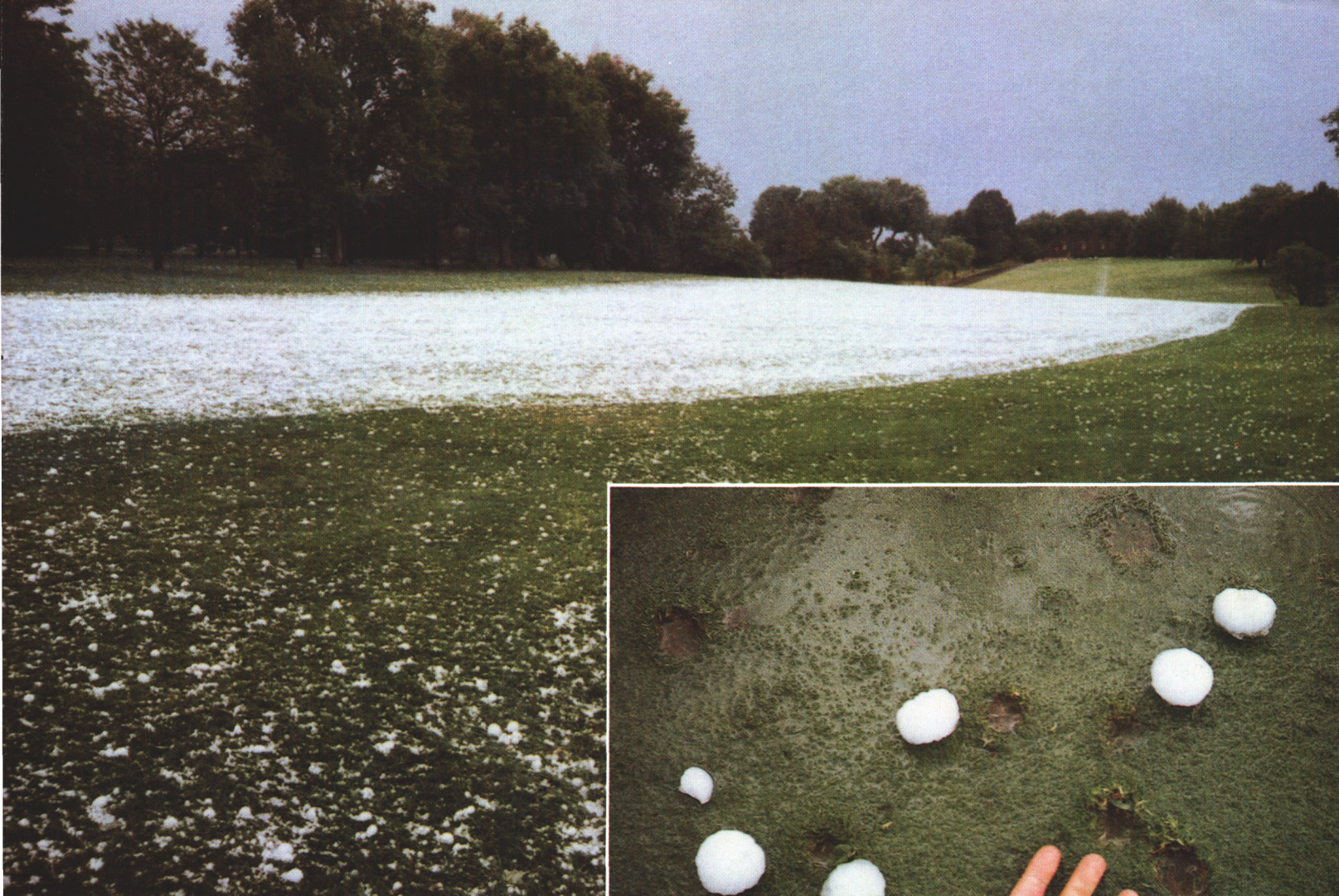
Include the entire staff. Even though a minority of the staff will be section employees, it is important to promote the team concept. There will be times when other employees will substitute during vacation or illness and on weekends. When every part of the golf course is in top shape, the entire staff wins.

Summary

Is section maintenance the best method for your golf course? This can be answered by evaluating the entire operation and answering these questions: Are you being as efficient as you can be? Are you paying close attention to detail work? Are the employees motivated to their highest level? Are you adequately staffed during the growing season? If the answer is "yes" to these questions, then the current system is working well. If the answer is "no," take a close look at section maintenance. The complex nature of golf course maintenance can be broken down into a much simpler form that can provide better results for you, the golf course, and the golfers who play the course.

How many mistakes has this employee made during course preparation?





Greens, tees, and fairways at Cherry Hills Country Club were blanketed by hailstones ranging in size from marbles to baseballs.

JUST ONE MORE LITTLE CRISIS

by **DAN PIERSON**

Superintendent, Cherry Hills Country Club, Englewood, Colorado

ON JULY 11, 1990, a tremendous hailstorm pummeled the Denver, Colorado, metropolitan area. It is documented to be the second most costly natural disaster in this country's history. Insurance claims now exceed \$750 million, and the costs of recovery are still climbing.

As fate would have it, Cherry Hills Country Club was located where the strongest portion of the storm passed through the city. Damage was severe and the storm inflicted its wrath on the course, clubhouse, and other amenities. Greens, tees, and fairways were holed

by hailstones ranging in size from marbles to baseballs.

The storm blew in with 80-mile-per-hour winds from the north. The greatest turf damage occurred on greens having a northern exposure, resulting in depressions measuring 3½ inches across and 2 inches deep. Trees and awnings were shredded, windows and skylights were broken, and patio furniture was thrown about. As if the storm wanted to emphasize its strength, the high winds changed direction after the hail stopped and pushed over two of our largest trees.

Initial cleanup expenses were in excess of \$45,000 for supplies and labor. The clubhouse awning alone cost \$20,000 to replace, and damage to the roof was estimated at \$400,000. These figures did not include expenses for the maintenance staff to remove and clean up the fallen trees and their debris. Our normal maintenance work per pay period averages close to 400 man-hours; the hailstorm increased that total by 100 extra overtime hours. The cleanup repair was a major project, but the problem was magnified by our club playing host to the USGA Amateur

Championship less than five weeks after the storm.

While standing on the first green and viewing the damage, I recalled the flood crisis that confronted my close friend Oscar Miles at Butler National. When faced with the damage that washed out his course during the Western Open, he said, "It is important to view these events as opportunities, not as catastrophes. It is essential not to panic." At that moment I hadn't the slightest idea of how I would incorporate that philosophy, but I remembered that a key to Oscar's successful handling of that situation was his confidence and leadership. The look on the faces of my staff at that moment and the concerned questions of many others later clearly indicated that they were looking to me for that leadership. It became the first opportunity . . . recognition.

AFTER a general inspection and some experimental repair, we determined that little would be accomplished with the few hours of daylight remaining that first day. Recognizing the efforts that would be required in the following weeks, my staff was sent home for some rest and mental relief from that first day's trauma. We planned to start at first light the next day, stay as long as light allowed, and continue the same schedule for quite a while.

That afternoon and evening provided time to formulate plans and communicate with the general manager, pro shop staff, club officials, tournament directors, and concerned members. This was the first time I recalled not having any difficulty contacting everyone I needed to speak with; they were all right there, wanting to help and looking for direction.

More importantly, I made the best use of the very few free moments I had to contact associates in the industry whom I knew and trusted, seeking their experience and advice. This communication garnered a great deal of technical support, and it proved to be a real psychological boost as well. The opportunity to discuss various options with others greatly enhanced my confidence.

As if by design, Jim Moore, the USGA Green Section's Mid-Continent regional director, had scheduled our annual turf visit for early the following morning. Jim was instrumental in supporting our initial efforts and developing a long-range plan. He instilled added confidence in all of us participating in the repair, as well as the ever-



growing number of concerned members who appeared. Many minds were eased with Jim's assessment that, given the total support of the membership and a little cooperation from Mother Nature, the necessary repairs might actually take playing conditions beyond what they had been before the storm. His words of wisdom were eventually confirmed.

The repair methods selected for each area of the golf course determined the assigned priority. Greens are usually given first consideration, and this was no exception. Following are the repair options we considered for our problem:

Greens

A. Broadcast seed on the damaged greens, topdress with a mix containing a light rate of seed, roll, and topdress

as often as possible. This process seemed the easiest and would allow players back on greens in the shortest time. It would also allow attention to be given to other areas of the golf course at the same time. This option, then, depended on new plants from overseeding to fill the voids. This would be a real risk.

B. Aerify with ½" hollow tines (1" x 2" centers), broadcast seed, and topdress using the cores as the topdressing mix. Roll the finished surface and topdress as often as practical. This process would provide a more efficient introduction of seed and a better growing medium. It would be more disruptive to play, require additional staff to accomplish, and still depend on fragile new growth to fill the voids.

C. Broadcast seed onto the damaged areas, hand repair as much as possible



(Opposite page, top) Cleanup and turf repair were major projects after the storm passed.

(Opposite page, bottom) The clubhouse awning shredded from the impact of the hail.

(Above) The greatest turf damage from the hailstones occurred on the greens, but the tees were not immune from injury, resulting in depressions measuring 3½ inches across and 2 inches deep.

with ball-mark repair tools, overseed again, roll, and topdress as often as possible during the five weeks before the tournament. Hand repair offered an additional method of incorporating seed into the soil.

D. Aerify after hand repair, in addition to accomplishing the items listed in "C." Aerification would provide another method of seed introduction and an initial topdressing from the existing greens mix.

The repair process on the greens was the only phase influenced by the approaching championship. At this late date, relying on a new population of bentgrass (as in options "A" and "B") to germinate, fill in voids, and reach reasonable maturity before the tournament seemed risky. With option "C," a moderate amount of mature grass could be moved into the middle of the

damaged area with a reasonable expectation of survival, and lateral growth into the remaining void would be initiated. New growth from the overseeding would eventually supplement the vegetative material. If there had not been other areas of the golf course to consider, option "D" might have proven to be the Cadillac of repairs, but there seemed a limit as to what could be accomplished and what the membership could reasonably accept. With this consensus, option "C" was chosen.

The next task was to locate a lot of bodies. Contract labor was considered, but the sensitivity of the job and a desire to involve people familiar with a golf course negated the idea. Our grounds staff of 35 and our 65 caddies (paid at a rate of \$20 for every 4-hour shift), were reliable, but their numbers were

not large enough. That's when our tournament director got on the phone and began calling for volunteers. Many members who could not miss work came at dawn and worked a couple of hours, returned at lunch, and then left work early to help again in the afternoon. Ladies who came to play that morning put their street shoes back on and pitched in with an attitude found only in dedicated lady golfers. At the height of the day we had three groups of 60 people, with each group tending separate greens. With this great turnout, the task became manageable and, surprisingly, was completed by mid-afternoon. With things progressing so well, I had the opportunity to start breaking away grounds staff to pursue the finish work of seeding, rolling, topdressing, dragging, fertilizing, and watering.

One of the things we didn't anticipate but learned soon enough was to keep lots of Band-Aids around when you ask someone to repair ball marks all day. Blisters developed rapidly and in some cases turned into open wounds. Vice grips made a more efficient weapon for avoiding injury than the divot repair tool. Expect a surprised look, however, if you go to the store and ask for 100 pair of vice grips. Thick carpet samples made good kneeling pads, saving knees and preventing knee prints in greens. We also kept the coffee, donuts, box lunches, and beverages coming to the field; it reduced desertion dramatically!

TEEES AND fairways were next. I felt similar repair programs would apply to both, but it wasn't clear how much would be necessary. Jim Moore, again, was a great help in sorting out the issues. Without specific attention directed to these areas, the best that could be expected was an undetermined amount of playing "winter rules," perhaps into the championship. I was sure the membership would prefer not to see this happen. On the other hand, with a little patience from the membership, a modified aerification and overseeding program could bring the course back to its previous excellence. Over the past several seasons we had been converting the fairways to ryegrass, which made this approach even more sensible. The club president, grounds chairman, and tournament chairman were there to lend their support for the renovation. The club would be closed to play during the time needed to accomplish the restoration.

Fairways were aerified with Core-master units in two directions. The cores were shattered with a dragmat to add a soil base for the overseeding. Overseeding then was accomplished using perennial ryegrass at a rate of 125 pounds per acre. The seed was dragged in, rolled, and irrigated.

Tee renovation was not as intensive as it was for the fairways due to the type of damage they incurred. The surfaces were restored by using deep-tine aerification, and they were smoothed by the rear roller on the machine. Topdressing and fertilization followed at 7- to 10-day intervals until the Amateur. One benefit resulting from the storm was that it allowed me to aerify in July in the same manner we normally do in September. When the fall season

arrived, we had an opportunity to deep-tine the entire golf course.

Routine maintenance after the storm was set back three to five days, but with the restoration process completed, course operations returned to normal. Within two weeks, fairways were being cut daily at $\frac{5}{8}$ " and there was little evidence of damage. During the recovery period, the greens cutting height was eventually lowered to $\frac{1}{8}$ " and then reduced to $\frac{3}{32}$ " for the Amateur. Signs of the incredible hail damage were difficult to find, with the exception of the newly germinated bentgrass.

Throughout the second day after the storm, I had another opportunity that Oscar would have enjoyed; once the word was out that Cherry Hills had

problems, the press was interested. Surely this can be viewed as another of those opportunities, but I personally tend to be a little camera shy. Everyone called that day, and I did three newspaper interviews and three television interviews. I was a nervous wreck, but a star.

With support from other local superintendents who provided extra equipment, labor, and supplies, the entire renovation process was completed in four days. Cooperative weather for the rest of the summer helped make every decision we made look like the proper one. This crisis was over and then someone asked me to write an article about it, providing yet another "opportunity."

After the storm, ball marks were hand repaired as much as possible, and the greens were overseeded, rolled, and topdressed to begin the repair process.



Greensmower Maintenance

by **TIM MORAGHAN**

Agronomist for Championships, USGA Green Section

"Putting greens are to golf courses what faces are to portraits."

C. B. Macdonald,
Golf Course Architect

REGARDLESS how well designed or maintained a golf course may be, the feature most remembered after the round likely will be the putting greens. It is a fact that 50 percent to 75 percent of golf is played on the putting surface, so the importance of following through with correct maintenance practices for greens cannot be over-emphasized. Before a single blade of grass is cut, however, proper care and maintenance of the mowing unit itself must receive first priority.

The Mechanic

The pressure to produce a quality putting surface at cutting heights as low as $\frac{1}{8}$ ", and occasionally less, can be enormous. The long-term effects of agronomic practices and player responses to course conditions suggest that not just anyone should be assigned the responsibility of repairing and adjusting a cutting unit. Your mechanic must have a thorough understanding of what will occur if the greens aren't up to speed, so to speak. When hiring or training a mechanic, consider that he must be well rounded in his understanding of the job. This should include:

- An understanding of the principles of mowing and its effects on the turfgrass.
- A basic knowledge of putting green agronomics.
- The ability to instruct personnel to properly use and care for mowing equipment.
- Having the "golfer's eye" and realizing the premium placed on putting quality.
- Being conscientious and taking pride in the results.

The Operator

When the mowing unit goes from the mechanic to the operator, proper training will avoid mechanical failures

and minimize the risk of poor mowing quality. Initial training should take place on a nursery green or a secondary practice green. Learning on the nursery green allows the new operator time to get the feel of the machine and to react when there is trouble with the cutting unit. He also learns to visually distinguish between a good and bad quality cut. An experienced operator accompanying a trainee can point out common problems and potential mistakes.

Cutting greens daily eventually wears out most working parts of any cutting unit. Prior to cutting a green, the operator should go through a routine look, listen, and feel checklist involving several items:

- With the unit OFF, visually inspect the reel and bedknife for chipped, bent, or damaged sections resulting from mowing or transporting the unit.
- With the unit OFF and stationary, close the fuel line and tilt back the cutting unit, exposing the underside of the bedknife. Inspect the mounting screws to be sure none are missing or loose.
- Inspect the unit for excess or dripping oil, grease, or fuel.
- Visually inspect the green and remove any debris.
- Pole or whip the surface to locate and remove small stones, sticks, ball markers, and golf spikes.
- While cutting, listen for irregularities in the sound of the motor or for poor contact between the reel and bedknife.
- An off-key sound indicates worn bushings, bad bearings, or loose bolts and belts.
- Don't allow the catch baskets to overflow with clippings. The added weight can lower the effective mowing height.

Grinding and Sharpening

Producing the correct reel-to-bedknife relationship is the key to a successful mowing operation. Grinding and sharpening to mate the reel and the bedknife are the two most important

processes in the mower maintenance program.

The bedknife is the stationary bottom blade of a reel mower against which the reel blades turn to produce a shearing cut. Bedknife maintenance includes proper grinding and filing of the front and top faces to an angle determined by the manufacturer. Grinding takes place whenever a new knife is used, after topdressing, and on a biweekly schedule throughout the mowing season. Grinding should be followed by backlapping, the fine sharpening and mating of the bedknife to the reel using a fine grit, emory-based compound. Filing the lead face produces a sharp edge that allows the turf to be sheared rather than torn. The life of a bedknife is related directly to the height of cut and the cultural practices utilized. When purchasing bedknives, consider the following:

- There are three levels of bedknife thickness: regular, thin, and championship. Selection is dependent on your mowing requirements. The lower the cutting height, the thinner the knife you should purchase.
- Use bedknives made of factory-recommended hardened steel.
- Check for bends in the bedknives prior to purchase.
- Match the mower brand with the bedknife. A proper fit between the two reduces wear and produces a finer cut.
- Remove the paint on the bottom of the bedknife prior to mowing to avoid drags.
- Check that all mounting screws are flush with the bottom of the bedknife prior to mowing to avoid streaking or dragging.

Reel Grinding and Sharpening

Proper and consistent grinding and sharpening of the reel blades is the second step in developing a clean, shearing cut. During the manufacturing stage, reels are ground to be perfect cylinders. Heavy use throughout the season, as well as improper adjustment procedures, cause this cylinder to become tapered at each end, thereby shrinking the reel diameter. Sharpening

the reel by grinding restores this cylinder, eliminates imperfections, and extends the life of the reel.

- Use one of the newer automatic spin grinders, which produce a consistent and true grinding effect. Human error is eliminated, and the reel will live a longer life.
- Avoid excessive grinding, for it shortens the life of the reel blades.
- Use a "softer" stone for grinding to extend the life of the reel.
- A light backlapping after grinding removes the burr produced along the blades, providing a better mating between the reel and the bedknife.
- Consistency is the key. One or two individuals should perform and monitor the grinding to prevent errors and keep the operation moving smoothly.

Reel-to-Bedknife Adjustment

After the mower is cleaned and brought to the mechanic, servicing and adjustments can begin. The most important adjustment is matching the reel to the bedknife. This mating determines the quality of cut, with the reel rotating across the stationary bedknife blade that is fixed to the bottom of the mower frame.

Use the *cut and crimp method* to check the reel and bedknife sharpness as well as the side-to-side adjustment. This ensures one side is not cutting more than the other. Fold a strip of newspaper in half, place it between the reel and bedknife, and check the quality of cut from side to side. The blades should *cut* the top section of the paper and *fold* (crimp) the bottom piece. If the reel does not cut the top piece, it may be adjusted too tight. If both pieces fold

over, both the reel and bedknife may need resharpening. Use the newspaper to check the quality of cut at all points between the reel and bedknife. The paper should have a clean, crisp cut and not be shredded or torn.

Cutting Height Adjustment

Cutting height adjustments should be performed daily by the mechanic, after the reel-to-bedknife mating is complete. Before setting the cutting height, inspect the roll drum and front roller for damage or end play. These components must be aligned and uniform to ensure that the height setting is correct and permanent. Check that the height is correct at each end of the bedknife, and gradually tighten the lock-down bolts. Always *recheck* the height to be sure tightening the lock-down bolts did not cause a change in the cutting height.



Another technique used is the *bar and screw* method. The mechanic sets the height, primarily by feel, by pushing and pulling the adjustment bar between the reel and bedknife. The more recent Accu-Gage is a precision measuring instrument for making highly accurate height-of-cut adjustments on greens-mowers in decimal readouts. There is still room for error, though, because different people will adjust the units differently. The same person should set and change the cutting height throughout the season to ensure consistent results.

There are several items that should be checked to ensure the height consistently remains the same.

- Provide your mechanic with a large enough, well-lighted area to facilitate maintenance and adjustment.

- Check the cutting height when the reel and bedknife are cold. Heat expands metal and can cause a misreading of the cutting height.

- Inspect the lock-down bolts and adjusting nuts at each end of the unit to be sure they are working correctly.

- Periodically check the cutting height each morning while the machines travel from green to green. Bumpy terrain and off-loading from a transport trailer can cause a change in the reel-to-bedknife adjustment.

Off-Season Maintenance

During the off-season, a total breakdown of each machine and servicing of all working parts should take place. This consists of:

- A complete unit breakdown and assessment of all working parts,

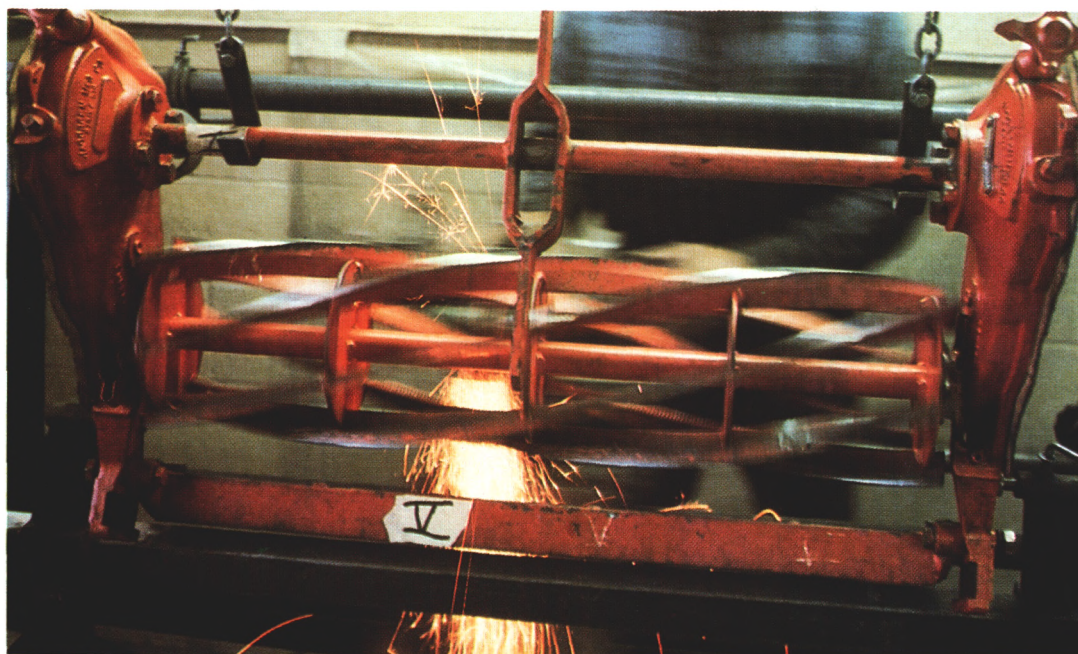
including the replacement of bearings, seals, and all nuts and bolts.

- Remove the engine from its mounting, dismantle, and re-ring the motor, de-carbon the heads, and rebuild the carburetor.

- Reassemble the motor, run a compression check, and bench test by letting it run.

- Prior to reassembling the entire unit, steam clean all the parts, apply a fresh coat of paint, and store in a clean, dry location until needed.

Proper maintenance throughout the year can save many breakdowns or accidents at unwanted times. Maintaining a consistent routine results in a longer and more satisfactory mower life, and can save money along the way, too.



(Opposite page) Guidance from the superintendent helps the mechanic understand the relationship between mowing quality and response of the turfgrass.

(Left) It all begins here. Correct grinding and sharpening lead the way to a clean cut.

(Below left) Improper mower adjustments or poor sharpening technique results in poor putting quality and turfgrass appearance.



A HISTORY OF TURF RESEARCH AT TIFTON

by **GLENN W. BURTON**

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Dr. Glenn Burton examines the turf produced by a new bermudagrass hybrid.

TURF RESEARCH at Tifton, Georgia, began in 1946 with a \$500 annual USGA Green Section grant to supplement the USDA-University of Georgia forage grass breeding research program begun in 1936. A survey of turf in the South by USDA scientist O. S. Aamodt and Fred Grau, USGA Green Section Director, had revealed a host of turf problems and practically no research to solve them. Developing a better bermudagrass to replace the sand greens or seeded bermudagrass greens became the first objective of the new research program.

In the fall of 1946, cupcutter plugs from the best turf on the best greens from a number of Southern golf courses were collected. These selections were increased and planted along with turf-type by-products of the pasture breeding program in 2-inch clay pots (16 of

each) in the greenhouse. In April, 1947, these plants were used to establish 10-foot square plots arranged with a seeded plot of common bermuda in the center of each group of nine. Beginning in August, 1947, these plots were subjected to golf green management for three years. Annual ryegrass was planted on half of each plot to study the spring transition. Again and again, throughout the season all plots were visually rated for sod density, color, frost and drought tolerance, resistance to weeds and diseases, transition effects, and overall turf quality.

In October, 1947, common bermudagrass from seed looked about as good as any of the selections. But after three years of testing, common bermuda from seed proved to be one of the poorest in the test. The best entry was number 57, an F₁ hybrid between a very dense dwarf

and a disease-resistant selection from the pasture breeding program. This hybrid, after much testing, was officially released as Tiflawn bermudagrass in 1952.

Tiflawn, like common bermudagrass, is a tetraploid with 36 chromosomes. Additional tests proved that Tiflawn was too coarse and produced too much growth for golf greens.

TO DEVELOP a finer turf, Tiflawn was crossed with the fine-leaved 18-chromosome *Cynodon transvaalensis*. The best of the many crosses made and tested was called Tifton 27 and later was named Tiffine. It had finer, softer leaves, made a better putting surface, had 27 chromosomes and was completely sterile.

A better putting-green grass was Tifton 328, later named Tifgreen and

released in 1956. Tifgreen was the best of many 27-chromosome sterile hybrids between *C. dactylon*, taken from the 4th green of the Charlotte Country Club in North Carolina. Tifgreen's fine, soft, forest-green leaves, few seedheads, and ability to make an excellent putting surface when mowed daily at a height of 1/4" account for its popularity and use worldwide.

A better 27-chromosome sterile interspecific hybrid for tees, fairways, athletic fields, and lawns was tested for three years as Tifton 419. Its superior characteristics included a darker green color, greater frost tolerance, earlier spring growth, denser weed-free sod, greater disease and insect resistance, greater wear tolerance, and greater leaf stiffness that gives a better lie to the golf ball than Tifgreen. It was officially released and named Tifway in 1960.

Beginning in 1946, a number of experiments were conducted at Tifton to learn how to grow better turf in the South. To determine the pH requirements of Southern turfgrasses, lime was applied to raise the pH of the Tifton loamy sand (pH 5.5) to 6.5, and sulfur was applied to drop it to 4.5. Growth of the principal turfgrasses showed that applying lime improved St. Augustinegrass and ryegrass turf, but hurt carpetgrass and centipedegrass. Carpetgrass grew well at pH 4.5, and bermudagrass grew well at all pH levels.

Research designed to determine the N-P-K fertilizer ratio required to grow good bermudagrass showed that a 4-1-2 to 4-1-3 ratio was adequate. Using these ratios to replace the 4-12-4 used at that time saved a lot of phosphorus and reduced the maintenance budget.

ATTEMPTS to use old pine sawdust, before and after composting, as an organic source for golf green topdressing failed. Evaluation of other sources was discontinued when sterilized loamy sand soil with no organic matter proved to be the best topdressing material for bermudagrass greens.

Some of the first research with the arsenical herbicide PMAS proved that it would selectively kill young crabgrass in bermudagrass turf. MSMA soon replaced it. Early research with 2,4-D found noticeable differences in the concentrations tolerated by the different turf bermudagrasses. The discovery that 2,4-D was an excellent post-emergent herbicide for broadleafed weeds is still used to hasten establishment of vegetatively propagated bermudagrasses.

Nitrogen fertilizers evaluated for turf bermudas included ureaform nitrogen, ammonium nitrate, ammonium sulfate, urea, and milorganite. Milorganite gave slightly better turf, but frequent applications of ammonium nitrate made the greens look about as good as milorganite and the slow-release ureaform materials, and it cost a lot less.

To test the shade tolerance of Southern turfgrasses without root competition under trees, 6' x 12' frames covered with green plastic screen that excluded two-thirds of the light were suspended 12" above plots of the grasses to be tested. The grass plot under each shade and the check of the same grass beside it were mowed at heights of 1 1/4" and 2 1/4". All grasses that received full sunlight maintained adequate density and color throughout the season regardless of mowing height. All shaded grasses clipped at 2 1/4" produced better turf than at 1 1/4". St. Augustinegrass and *Zoysia matrella* were the most shade tolerant, and common bermudagrass was the least. Tiflawn and Tifgreen cut at 2 1/4" were more shade tolerant than common bermudagrass.

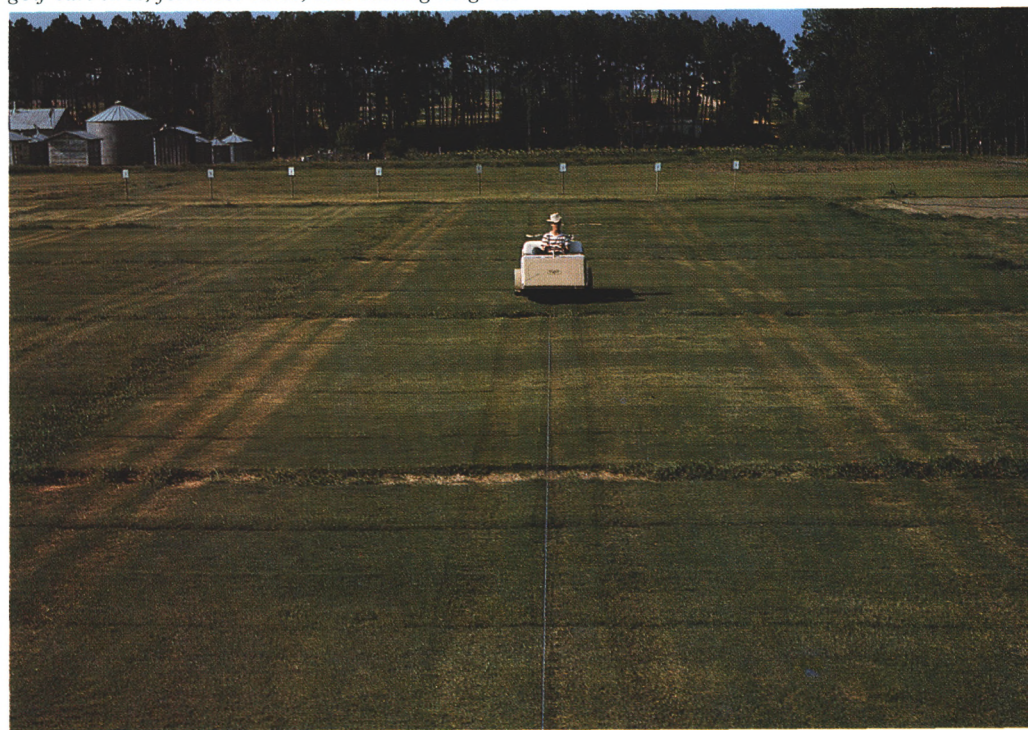
Centipedegrass had been planted vegetatively on several lawns in 1936. It can now be established from seed thanks to Tifton research that demon-

strated the fertilization and management required to produce centipedegrass seed commercially.

When golf carts appeared on the scene, golf course superintendents expressed great concern over the damage they might do to turf. As a consequence, a three-wheel golf cart with three different tires was driven at three different frequencies over the Tif bermudas, fertilized differently, and cut at different heights, until the tracks of the tires had nearly destroyed the turf on the poorest treatments. The results of that research helped golf cart manufacturers choose tires that would least injure the turf. Tifway bermudagrass was the most wear-tolerant grass, and fertilizing the grasses and raising the height of cut increased their wear tolerance.

Tifdwarf, officially released in 1965, was first discovered by USGA Green Section agronomist James B. (Monty) Moncrief. It was a small circle (18" in diameter) in a golf green planted experimentally to Tifgreen on the Florence, South Carolina, Country Club several years before Tifgreen's release. A few weeks later, T. M. Baumgardner brought to Tifton a plug taken from a similar circle of grass on a golf green on the Sea Island Golf

Experimental bermudagrasses were tested for wear tolerance by using different golf cart tires, fertilizer rates, and cutting heights.



Course, which had been planted to the same Tifgreen material from Tifton.

The dwarf bermudagrass in both plugs was isolated, increased, and planted in an evaluation test with Tifgreen and two other grasses. Three years of testing indicated that the dwarf bermudagrass was a natural mutant of Tifgreen that had occurred before its sprigs had been sent to several golf courses for early evaluation. The Florence and Sea Island golf courses apparently received some of this mutant in the experimental sprigs, and their golf green management allowed the dwarf mutant to spread into the Tifgreen sod.

Tifdwarf is a sterile triploid and has many of the same characteristics of Tifgreen but has smaller, shorter leaves, stems, internodes, and stolons, and establishes more slowly. It has a darker green color than Tifgreen due to its greater concentration of purple anthocyanin, which gives Tifdwarf a purplish cast when temperatures approach freezing in the fall. Tifdwarf will tolerate closer mowing than Tifgreen and is the only bermudagrass that can produce the fast greens that some golfers demand today. When properly managed, Tifdwarf greens can be comparable to bentgrass greens. In fact, northern golfers playing on such Tifdwarf greens have asked the golf course superintendent the name of the bentgrass on their greens. A number of years ago, Ben Hogan completed 18 holes on a well-managed course with Tifdwarf greens and Tifway fairways and tees and

said, "That is the best turf I've ever played on."

THE STERILE triploid hybrids cannot be improved by conventional plant breeding methods. They can be modified by exposing dormant sprigs of the triploids to 7,000 to 9,000 r of gamma rays from a cobalt-60 source. This was done at Tifton in 1970 and resulted in 158 mutants of Tifway, Tifgreen, and Tifdwarf that were evaluated until 1981, when a mutant of Tifway was released as Tifway II. Tifway II looks like Tifway but is more resistant to root knot, ring, and sting nematodes, is more frost tolerant and greens up a little earlier in the spring.

In 1983, Tifgreen II, a mutant of Tifgreen that has a lighter green color, greater cold tolerance, lower maintenance requirements, and better spring recovery was released. It is a little coarser than Tifgreen and makes a less desirable putting surface.

The most recent Tifton release is Tifton 10, a clone that I found in a lawn in Shanghai, China, in 1974. It has 54 chromosomes instead of 27 or 36, sets few seeds, and must be propagated vegetatively, but spreads faster than the Tif bermudas. It has dark bluish-green color, good winter-hardiness, salt tolerance, and ring nematode resistance. Tifton 10 is coarser than the Tif bermudas.

Research on the transition problems, establishing cool-season grasses on bermuda greens in the fall, and recovering bermudagrass when the cool-season grasses die out in the spring, revealed

that the spring transition could best be solved by building a strong, undisturbed bermudagrass turf in the fall. Cool-season grasses, including bents, fescues, and *Poas*, were compared with annual ryegrass for overseeding before turf-type perennial ryegrasses became available.

Other research projects conducted over the years at Tifton include:

- Disease, nematode, and insect studies and development of control measures.

- One of a number of crosses between *Zoysias japonica* and *Zoysia tenuifolia* became Emerald, a superior vegetatively propagated, matrella-like cultivar.

- A comparison of warm-season grasses ranked the Tif bermudas at the top in drought tolerance and the *Zoysias* first in cold tolerance.

Developing better quality, more winter-hardy triploid bermudagrasses continues to be the major emphasis of the turf research program at Tifton today. New hybrids are being made and tested. Dr. Wayne Hanna, now responsible for most of this research, has used mutation breeding to improve the quality of the winter-hardy "Midiron" bermudagrass and dwarf Tifton 419. Improved centipedegrass and turf bahiagrasses are also being developed.

The author gratefully acknowledges the assistance of a great host of people, students, technicians, colleagues, and friends, who at some time helped with the research described here.

Mutations of Tifton 328 and Tifton 419, induced by cobalt 60, were established in the field to evaluate turfgrass quality.





NEWS NOTES FOR SPRING

USGA Funds Environmental Impact Studies

The USGA Turfgrass Research Committee has awarded \$2.8 million for environmental research to be conducted by 16 land-grant universities across the country and the United States Department of Agriculture. Several universities have joined together in a cooperative arrangement on some of the research projects. The goals of the environmental impact study are to:

1. Develop a better understanding of turfgrass pest management and fertilization effects on water quality and the environment.
2. Evaluate alternative pest control methods to be incorporated in IPM programs.
3. Determine the influence golf courses have on people, wildlife, and other non-target organisms.

Universities receiving grants include: California — Davis, California — Riverside, Clemson, Cornell, Florida, Georgia, Iowa State, Kentucky, Massachusetts, Michigan State, Nebraska, Nevada — Reno, Penn State, Rutgers, Texas A&M, and Washington State.

Historically, the sport of golf has maintained a leadership role in the development of improved turfgrasses and management practices through the activities of the USGA Green Section. Understanding pesticide and fertilizer degradation, fate, and impact on our environment is critical for managing turfgrass systems at the highest level of efficiency. In addition to this goal, development of alternative methods of

pest control holds much promise for incorporation into turfgrass management programs in the future. Golf's leadership role will be continued as the USGA moves forward with this research program.

Research begun in 1982, with support from the USGA and GCSAA, has resulted in the release of two new grasses thus far. NuMex "Sahara" bermudagrass and "NE84-609" buffalograss are available in the market and have demonstrated success. Royalties received by the USGA from new turfgrass varieties will be recycled into other turfgrass research projects in the future.

Turfgrass is only one component of the golf course, though. By expanding its research scope, the USGA is moving ahead to increase the understanding of the impact golf courses have on the environment. The results of these studies will be crucial to the construction and maintenance of golf courses well into the next century.



Are you battling bermudagrass, dealing with disease on your greens, or just trying to find a specific article that you "know you just saw"? The USGA-sponsored Turfgrass Information File (TGIF) at Michigan State University can help. The USGA/TGIF database provides turfgrass managers with easy access to published materials on turf-

grass culture and golf course management.

Information is now easily available to everyone. USGA/TGIF has put together more than 35 prepackaged searches on the most popular topics, with more to come. Each search lists published articles about the topic, with an emphasis on newer materials. Just a few examples of search topics include:

- Turfgrass Benefits
- Groundwater Issues
- Water and Water Use
- Green Construction
- White Grub Control
- Greens Management
- Bunker Reconstruction
- Wildflowers
- IPM
- Green Speed
- Localized Dry Spots
- Poa annua* Control
- Pesticide Safety/ Handling
- Cultivation Techniques
- Irrigation Scheduling
- Winter Play
- Transition Zone Management
- Member Relations
- PGR's

These searches or information on any other topic of interest are available for a nominal charge by calling TGIF. Subscribers can access the system by computer as well. Superintendents, turfgrass managers, course officials, researchers, and students will all find USGA/TGIF an invaluable resource tool. This comprehensive source of answers is right at your fingertips.

Give us a call — (517) 353-7209.

Join the Audubon Cooperative Sanctuary Program

Wouldn't you like to become involved in a program that will benefit both the game of golf and the environment? If so, sign up for the Audubon Cooperative Sanctuary Program for Golf Courses. It's sponsored in part by a grant from the USGA and is administered by the Audubon Society of New York.

By participating in the program, golf courses will be involved in projects that enhance the habitat for wildlife on their property and protect and preserve natural resources for the benefit of their communities. In doing so, golf courses will take a leadership role in resource conservation and protection, and will be recognized by the public for the positive environmental role they play.

To become involved in the program, simply fill out and return the registration form along with the \$100 registration fee. You will receive a resource inventory handbook and a one-year subscription to *Field Notes*, the Cooperative Sanctuary newsletter. Complete the questionnaire and the resource inventory handbook and return them to the Audubon Society of New York. They will prepare a report based upon this information, suggesting various

wildlife habitat enhancement projects and resource conservation programs. Educational fact sheets that provide details of the projects will accompany the report.

There is no obligation to follow through with the recommended programs, but a golf course can become a Certified Cooperative Sanctuary by developing an environmental "plan of action" and notifying Audubon of the plan. The course must also form a Resource Committee, involving at least one non-member local person who can provide technical assistance for some phase of the environmental enhancement program. For example, this person could be from the local Cooperative Extension Service, Soil Conservation Service, or other environmental agency or organization.

The purpose of requiring someone from outside the club to participate on the resource committee is twofold: (1) to provide technical expertise that is not available from anyone at the course, and (2) to let community agencies and environmental organizations know that the golf course has made a sincere commitment to protecting and enhancing

the environment. This interaction can do nothing but help the image of golf courses as good environmental neighbors in their communities.

No restrictions are placed on the property as a condition of participation in the Audubon Cooperative Sanctuary Program. All decisions concerning the implementation of suggested programs remain with the golf course superintendent and course officials. For courses that follow through with these programs, there will be opportunities for regional and national recognition awards. In fact, once the program begins to generate results, individual course projects will be highlighted here in the GREEN SECTION RECORD.

Interested in more information? For a brochure and for answers to your questions, contact Ron Dodson, President of the Audubon Society of New York, at (518) 767-9051, or Nancy Sadlon, Environmental Specialist with the USGA, at (908) 234-2300.

Take the step that does something positive for the environment and lets the public know of the environmental benefits of golf courses. Join the Audubon Cooperative Sanctuary Program today.



Plentiful wildlife is a sign of a friendly environment. Join the Audubon Cooperative Sanctuary Program and do your part for nature.

ALL THINGS CONSIDERED

When Perfect Is Not Perfect

by **TIM MORAGHAN**

Agronomist for Championships, USGA Green Section



Photograph by © ROBERT WALKER

The mid-April look at Augusta that makes golfers more demanding and sends chills down the spines of golf course superintendents throughout the world.

ABC television is broadcasting the PGA Tour, the LPGA can be seen live on ESPN, and I can view the Senior Tour on the USA Network, all at the same time — a golf fanatic's dream. Each weekend, I grab my remote control and punch my way into golfing nirvana, witnessing precise swing planes on finely manicured golf courses across the country. Television brings into our living rooms fabulously conditioned golf courses each and every week of the entire year. I sometimes wonder if this heavy exposure is in the best interests of golf.

On one hand, television exposes a great game to lots of people. By doing so it encourages non-golfing viewers to participate and broadens the base of support for the game. Television demonstrates the well-mannered honesty, integrity, and sportsmanship of those who compete. It is a venue for golf organizations such as the USGA, GCSAA, and the PGA of America to showcase their involvement in the game

for our benefit. Finally, television promotes the various charitable causes on whose behalf the tournaments are held.

On the other hand, televised golf is a poor representation of the real world, especially with respect to golf course maintenance. How so? Consider that the three professional Tours play a total of 130 events each year, and that 50 percent of these events are televised. Therefore, we see at least one perfectly manicured golf course each week for 52 weeks. Does the average viewer realize, though, that the host club's maintenance staff plans and prepares for 51 weeks, and do viewers realize the agronomic sacrifices that each club endures while striving towards perfection? What does all this televised perfection each week lead to, and how does it affect your club?

To begin with, it can lead to an intolerance among golfers, at both public and private courses, for anything less than the perfection they can see on

TV. These golfers' demands are formulated without consideration for the high budgets, equipment and labor costs, logistical problems, outside contractor assistance, guidance from the event's professional organization, and the hundreds of volunteers who help bring off a one-week extravaganza each year.

What is it about television golf that prompts golfers to demand so much? Consider the following:

1. Television commentators know almost nothing about and never mention the work and time it takes to agronomically prepare turf to peak for an important event. Fast greens and uniform rough don't appear overnight; they are planned for and gradually brought into existence.

2. Revenues generated by playing host to such events allow clubs to budget for the overtime and extra equipment necessary to produce the pristine conditions we see. Also, high expectations from the professional golfer, combined with the superintendent's pride in his own performance, cause many long hours to be spent in preparation.

3. April is a fine time for the Masters and a fine time to watch golf, especially if you live in the North. Don't forget, however, that your course and superintendent are just beginning to emerge from winter and that a brief taste of early spring warmth doesn't bring the golf course into mid-season form. Mother Nature still calls the shots, after all.

4. The TV camera's eye has the ability to show the perfect lie, stemming in part from the fact that television follows the leaders, who are playing well and are hitting the ball to the middle of the fairway and then to the green. In addition, we hear announcers rave about conditions without explaining how they got that way, and when they do explain, their information is often wrong or misleading.

The road to solving this problem is a long one, but it could begin by television commentators explaining to the home audience what they are seeing and why. Allow the golf course superintendent to have his/her say about how the course is maintained. Show a picture of the course at the midway point of preparation, possibly six months prior to the event, to indicate that it is not perfect year round. Golfers must realize that no course can be kept in peak condition throughout the year. Peaks can only occur once in a while.

TURF TWISTERS

LEAK THE WORD

Question: Periodically, our equipment malfunctions and we have a hydraulic oil leak that injures the turf. Any thoughts on what to do? (Kentucky)

Answer: If you are in the golf course business long enough, this problem will affect you sometime. An excellent piece of research was conducted on this problem and published in the 1980-1981 University of Kentucky Research Report. Basically, there is a need for speed in applying the proper type of soap or detergent to the grass. The suds, which pick up the oil, must be diluted with plenty of water or else removed to prevent damaging an even greater area. A shop Wet-Vac powered by a portable generator works well for this purpose. We have also seen good results where oil leaks have been treated with water-based degreasers (non-butyl) mixed with a wetting agent.

GRASS CLIPPINGS

Question: Our landfill will not accept grass clippings, so we have decided to return clippings to the fairways. Will this cause a thatch problem? (Michigan)

Answer: University studies have failed to link the return of turf clippings with thatch accumulation. When fairway mowing removes no more than $\frac{1}{3}$ of the grass blade, the clippings are small and decompose rapidly. Many superintendents drag a chain or hose across the fairways to disperse clumps of clippings that result from infrequent mowing or mowing of wet turf. You could also use manure spreaders to disperse clippings into rough areas (see the March/April 1989 GREEN SECTION RECORD). A third possibility would be to start a compost area and use the organic material on the golf course.

CONTRIBUTE TO THE EARTH

Question: Throughout the golf course I have certain areas where castings from earthworm activity create a real nuisance. What is the best solution to solve this problem? (Florida)

Answer: Earthworm activity is a sign of a healthy soil condition. Benefits from earthworm activity in the soil include improved soil structure, nutrient release, and actual thatch reduction. While castings from earthworms may cause problems with mowing equipment and playability, environmental awareness and the goal of pesticide reduction on the golf course discourage chemical control of this beneficial "pest."

Set a precedent in your area. Work around the problem areas. Wait until the castings dry and use a light drag mat or brush to disperse castings prior to mowing. Mowers won't be damaged and mowing quality will be maintained. Ask members for their patience in this matter. Inform everyone you are helping to protect the environment by using less pesticides.