A Publication on
Turfgrass Management by the
United States Golf Association®

May/June 1982

USGA®

Green Section RECORD

USGA®

Green Section RECORD

EDITOR:
William H. Bengeyfield

MANAGING EDITOR:
Robert Sommers

ART EDITOR:
Miss Janet Seagle

Vol. 20, No. 3
MAY/JUNE 1982

Cover Photo:
Irrigation — proper installation is the key.

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 $6 a year.**

Syringing — another degree of system diversity.

Irrigation – The Hidden Story

by CHARLES B. WHITE
Agronomist, Southeastern Region, USGA Green Section

IF YOU WERE TO evaluate all the factors responsible for quality turf, a well-designed irrigation system would surely top your list. Without water, there can be no grass. Many believe irrigation is the single most important practice in turfgrass management today.

What a wonder, then, how few realize that the irrigation system is a management tool. Golf course operators strive to buy the best machinery for their money, so why shouldn't golf course irrigation be given the same consideration?

The hiring of a qualified irrigation design engineer is the initial step to a quality system. It is always best to hire a reputable irrigation engineer who is known in the field, one who has installed systems that can be observed while in operation and discussed with their owners. Experienced engineers may be more expensive, but the quality of work and service from the system will more than justify the additional cost. A competent engineer is the key to the success of a well-designed system and pump station. Engineering is not a place to cut corners.

A knowledgeable superintendent can be of tremendous help to the irrigation engineer. He has the local knowledge; he is the person who must work with and depend upon that irrigation system once it is installed.

What type of turf to be grown should be considered early. This involves two basic concerns: first, the water requirements of that specific turfgrass, and secondly, the environmental conditions of the area in regard to annual rainfall, temperatures, severity and duration of stress periods. These environmental factors determine the irrigation frequency that must be designed into the system.

Such requirements will determine the delivery needs the system must meet in terms of water capacities and frequencies of cycle, because the irrigation system is designed to supplement the annual rain-

fall and to replenish losses from evaporation. Note the phrase "supplement the annual rainfall"; that is an important part of system design. A system is not designed to furnish the needs of a specific turfgrass completely.

THE NEXT consideration of design is the source of water. Water is now being scrutinized very carefully for recreational use in many areas of the country, and quality of water as well as quantity is becoming a critical issue. Often, golf courses in some sections of the United States irrigate with water exceeding 2,000 ppm salt. This can create turfgrass problems, especially when improperly used.

Recreational areas, such as golf courses, will be the first to be cut off when potable water becomes limited. Thereafter, other sources, such as effluent water, must receive primary consideration for future use. This fact requires special planning for the irrigation system. Special filtering systems for pump stations as well as more frequent filter checks for the individual sprinkler heads will be needed. Anticipating future water problems will hopefully encourage irrigation design for maximum efficiency with all kinds of water sources.

Once all the variables have been studied, it is time to decide exactly the type of system needed. Major considerations for determining the overall plan include the coverage desired, soil infiltration rate, frequency of application and type of irrigation control. Uniform coverage is essential. Wet spots and dry spots can easily be introduced by poor design or improper installation.

One important aspect of uniformity of coverage is the need for specialized heads. Many times, specific coverage patterns must be applied in areas to cope with high winds, steep slopes or non-target areas. Low-angle nozzles in windy areas will help minimize wind-caused distortion and improve coverage of that head. Low-pressure and low-precipitation heads help on steep slopes when large water volume could cause severe runoff and erosion problems.

Other areas that require specialized water control, such as residential perimeters and clubhouse grounds, are in and around golf courses. Here the

Quick couplers should be readily accessible and easy to locate.

Swing joints of all PVC construction act as shock absorbers for the piping system. This one is ready to install.

engineer will utilize part-circle heads to control water applications.

Quick coupler valves are frequently neglected in automatic systems and systems of total pop-up, irrigation-type heads. A quick coupler can be one of the handiest components in a golf course irrigation system; one should be located at every green and tee, and several should be in every fairway. Ideally, par-4 and par-5 holes should have a quick coupler every 200 feet to provide readily accessible water for all types of supplemental needs, such as filling sprayers, watering ornamentals, or operating set sprinklers in specific areas. Quick couplers should be installed immediately adjacent to an irrigation head so they can be located easily.

It is also important to design the irrigation system to insure that its delivery rate does not exceed the infiltration rate of the soil. A prime example of this is the high-silt clay soils that require light, frequent applications of water not to exceed infiltration rates. The converse examples are the high-sand soils of Florida and other areas where infiltration rates almost cannot be exceeded by the irrigation system.

FREQUENCY OF application required is important. It will determine how elaborate a system will have to be. For example, if the entire golf course must be watered every night, the system must be much more elaborate and much more expensive than a golf course requiring only once-a-week irrigation. This goes back to the demands of the system for delivery rates. The elaboration and expense come from increased pipe size to meet higher demands, the increased requirement of the pump station to deliver water and the greater precipitation rate of heads needed to meet the requirements of irrigation frequency.

The type of system actuation is the last basic factor in determining the irrigation needs of a course. The best approach to control is individual head control or as few heads per station as possible. That is, to be able to control each head independently wherever possible and as few heads as possible where individual head control is not feasible.

The closer one can approach individual head control, the better the handle on controlling water rates and watering to the particular needs of the golf course. Greens and tees should certainly have individual head controls.

Fairways should be sectioned into blocks as small as affordable. It would not be feasible to water the entire fairway for one specific dry spot which commonly occurs in landing areas or approach areas to the greens. This is why stationing is so critical. Station requirements should be designed to provide maximum control of water distribution and placement. A maximum of four heads controlled by one station is frequently suggested for fairway application.

The degree of control is also important for specialized functions, such as syringe cycles. Courses with creeping bentgrass greens may require syringe capabilities for the hot summer months, while courses with bermudagrass greens will require light, frequent applications in the fall when establishing the overseeding cover of cool-season grasses.

The type of control mechanism forces another decision. Hydraulic versus electric is always a controversial subject, but both do have advantages and disadvantages that the design engineer will

Pipe misalignment need not be a headache.

point out. The hydraulic control system is used in many cases because its operation is somewhat simpler to understand. However, it cannot be used as effectively on courses that have significant elevation changes, because pressure losses in the control tubing can prevent accurate operations. Further, water supply for the control lines must also have a clean source, preferably from a potable water system. Even a small amount of debris can quickly cause clogging and failure of the hydraulic system.

Electric controllers, on the other hand, are often avoided in areas of frequent thunder and lightning storms. This is a common problem in south Florida, where the level terrain is conducive to hydraulic controllers.

AFTER MAKING the above considerations, the next step is to determine the type of pump station needed to deliver the demands of the designed system. The irrigation engineer will undoubtedly design the pump station to handle the system adequately, but the superintendent should also know some of the basis of design so that he can contribute his views on station selection and function.

Electric motors supply the power for the pumps and should be studied to determine function characteristics. For example, turbine-type motors and pumps are much more efficient than centrifugal or submersible pumps. Also, one large pump is more efficient to operate than two smaller pumps, but a golf course irrigation system cannot afford to be at the mercy of a single pump. If there is a breakdown, a tremendous amount of grass may be lost before the pump is repaired. This is why it is essential to have two or more smaller pumps to meet the demands of the irrigation system.

A jockey pump is usually the second power source. It is normally 20-25 hp in size and set to cycle no more than five times per hour to maintain pressure in the system. It also supplies small demands for water, such as syringe cycles or specific area watering for two to three heads.

One important consideration to remember in evaluating the feasibility of a jockey pump is the function that it serves. Starting an electric motor requires 150 percent of its electrical demand. Any time larger motors are used to maintain pressure for small delivery demands, a tremendous amount of electrical power is used.

To better understand the electrical requirements of a jockey pump, if you wish to irrigate at the rate of 10 gallons per minute and the main pump delivers 100 gallons per minute, this is 10 percent of its electrical power. This means that 30 percent of the electrical requirement of that pump is being wasted to meet the small demand. Over a period of time, this can significantly add to electricity costs. Moreover, this low demand causes frequent cycling of the pump, thereby creating severe surging in the lines, which in turn may lead to pump and pipe damage. The importance of the pumping station cannot be overly stressed. It is the heartbeat of the entire irrigation system.

After the system's design and pump station have been established, the next step is to plan the actual installation.

The pump station site is a natural beginning point since it is from here the pipe runs to the extremities of the course. The type of pipe to be used is very important. This will be established by the irrigation engineer. Usually, 160 psi PVC pipe is used for most large turf irrigation systems.

As the pipe installation progresses, it is vitally important to make sure swing joints are installed properly for each irrigation head. The best swing joint material is schedule 80 PVC. PVC has proved to be much better for swing joints than galvanized pipe because there is no corrosive breakdown and it is cheaper. Schedule 80 PVC is needed because it is much stronger than schedule 40 or 160 psi and withstands shock from traffic and surface abuse to which irrigation heads are normally subjected.

Swing joints must be constructed and installed in the proper manner. They may very well be the most important component of the piping system, and they should never be omitted from large turf irrigation systems.

GATE VALVE sectioning is another very important step that must be accurately accomplished to prevent system failure in the event of a line break. Gate valve locations will be arranged by the design engineer to section off the piping system. This enables the operator to isolate a line break, and the entire system will not have to be shut down to repair it. Gate valves should be boxed for ease in location and accessibility. All valve boxes should be well removed from play areas such as greens, tees and fairways. Plastic or concrete valve boxes are more feasible and durable than metal. Gate valve sectioning will increase costs because of the need for additional pipe, valves and valve boxes, but these costs are insignificant compared to the benefits received.

As the pipe, swing joints, heads and valves are being installed, the control lines are simultaneously being laid down. Whether electrical wires or hydraulic tubing is used, their placement is critical to prevent damage and insure positive relocation. The best position for control lines is to place them on the left-hand side of the piping with the swing joints on the right side. This procedure will help insure against damage when repairs to lines are made. The pipe serves as a protection for these lines and insures that their exact location is always known. Position there insures that they will not interfere with the action of the swing joint, which could pinch or sever the lines. All splices in control lines should be well-made and located in a valve box. This allows for easy accessibility to splices and makes for easy tracing of electrical breaks or hydraulic tubing clogs.

After all components have been installed, thrust-block construction and backfilling follow. Thrust blocks should never be omitted from an irrigation system. They prevent pipe separation and blowouts due to water hammer. Often, bricks or rocks are used as thrust blocks, but these materials can severely wear the pipe as it vibrates and moves as water under pressure flows through. Thrust blocks must be composed of five parts sand, two parts gravel and one part cement. This mixture allows for adequate rigidity but does not form too hard a surface, one that is abrasive to pipes and eventually causes a puncture at the surface.

The positioning of a thrust block is as critical as its composition. Ordinarily, this cement mixture is used as a wedge between the pipe and the trench wall. In heavy clay or gumbo soils, the wall of the trench can be used as a thrust support, providing the joint is secured tightly against the wall and the cement mixture is poured to keep the joint stationary.

If a joint occurs where there is no trench wall to pour the thrust block against, other arrangements must be made. Concrete reinforcing rods do a very effective job of anchoring thrust blocks when driven in the ground at the joint to be secured. They are aligned in double rows about two inches apart, four rows deep, and driven level with the top of the pipe. The cement is then

Bundled control tubing makes for easy repair.

poured around the joint and reinforcing rods, which should hold the pipe securely in place.

Once all thrust blocks have been constructed, the backfilling of trenches should be completed as quickly as possible to secure the system in the trenches and prevent float-outs from rainstorms. Make sure clean soil is always used for backfilling over the pipes to prevent direct contact with rocks or other foreign matter. As mentioned previously, the pipe movement against such material can cause severe damage to pipe surfaces.

Initial backfilling is done between joints, leaving all joints exposed. Once this backfilling and tamping is finished between joints, the system can be pressurized and checked for leakages. It is best to let the irrigation system function for approximately two weeks so that all joints, valves and heads can be observed for leaks and performance. This is also a perfect opportunity to observe coverage patterns, because dry spots can easily be located on bare soil.

After the pressure check is completed and proper coverages are established, the "as built" can be verified as to the exact location of all heads, valves, control lines and splices, and control boxes. The "as built" is simply a re-adjusted irrigation plan which provides a complete and thorough system analysis of exactly how that system was installed. It will be invaluable for future reference when repairs are needed or component locations are needed to prevent damage from excavation projects. Needless to say, this can save tremendously on money and man-hours in the future.

ONCE THESE operations are completed, the next step is to backfill trenches and tamp the soil firmly in place. Tamping is essential to prevent future settling and depressions over each irrigation line.

Once backfilling and tamping are completed, the final grading can be set without future settling of the irrigation line. After the turfgrasses are established, it will be necessary to make the final height adjustment on heads and valve boxes. This is a very tedious job, but proper swing joint installation makes it as easy as possible. All heads should then be made absolutely flush with the surface. Low heads will cause depressions and high heads are subject to mower damage.

Quick couplers are probably more important for leveling than pop-up heads because dirt can easily infiltrate into the quick coupler and cause clogging. Some pop-up heads do have somewhat of a self-flushing system as they are activated and inactivated to keep some of the soil out during the establishment phase. In either case, it is important to stress that eventual head and valve leveling to the grade of the existing turf is a necessity.

Now that the installations have been completed, the grass establishment phase is begun. If all the steps outlined above have been followed, the golf course superintendent can establish his turf with confidence. The irrigation system will deliver when and where necessary. It is the single most important management tool he has at his command.

(Special thanks to William Fuller, Augusta National Golf Club, and Mark Hampton, Wyndemere Country Club, for their help in preparing this article.)

Early April topdressing smooths the putting surface, improving playing conditions at the Hollywood Golf Club, New Jersey.

Early Spring Greenup – Don't Push It

by JAMES T. SNOW
Agronomist, USGA Green Section

OF THE VARIOUS concerns expressed by golfers in northern climates, few are more perennial than the one about early spring greenup and growth of putting greens. The first few days of warm weather, after a long winter's layoff, prime the juices in many golfers' systems; they believe the golf course turf should be as ready-to-go as they are. Anticipating lush, green grass and mid-season play, they rush to the golf course in the early spring only to find semi-dormant, off-color putting green turf.

The problem is compounded because, at the same time, Kentucky bluegrass and perennial ryegrass turfs are showing deep green color and producing marvelous growth. The fact is that bentgrass (or bentgrass/*Poa annua*) turf simply takes longer to reach its optimum growth rate in the spring, and no amount of coaxing will change this to a significant degree. In spite of what may seem to be warm air temperatures, normal growth will not resume until soil temperatures have increased to the point where root uptake has been stimulated.

There is a common misconception that early spring fertilization and irrigation is the best means of overcoming cold soil temperatures and encouraging spring greenup and growth. In fact, volumes could be written citing examples of golf course greens which have been heavily fertilized and watered in an effort to force growth during the spring, only to have turf areas die out during June, July and August because they have been overstimulated. Some of the fertilizer applied during March and April becomes available only during

May and June, causing a spurt of growth which makes the greens slow, lush and susceptible to wear injury, disease and wilting. The root systems, inhibited by excessive fertilization and irrigation, are usually shallow and weak by June and unable to support the turf during the hot summer. In the final analysis, early spring fertilization and irrigation cause more problems than they solve.

What Can Be Done?

Obviously, knowing what should *not* be done to bring the greens into good form in the spring does not resolve golfers' complaints about off-color, bumpy turf. Fortunately, a number of practices can stimulate spring color in a positive way and produce a smooth, true putting surface during the early spring, when topgrowth may be negligible.

For many years, fertilizing turfgrasses after September was considered risky. There was fear that stimulating growth with nitrogen just before the onset of cold weather would cause the turf to be susceptible to winter damage. Research during the past decade has not been able to substantiate this concern, and late fall fertilization has been of great benefit in some areas. Root growth, turf density, recuperative capacity, and spring greenup and growth are all improved with late fall fertilization. A good rule of thumb for timing such applications is to put the fertilizer down just after the turf has been mowed for the last time, when topgrowth has ceased, but before the ground is frozen. At that time of the year, root growth and nutrient uptake will continue until the ground freezes. Those nitrogen sources requiring microbial activity for nitrogen release are not as effective as the more soluble materials during the cooler months. On greens, therefore, rates of fertilization should not exceed ½-lb. N/1000 sq. ft. for soluble sources and 1-lb. N/1000 sq. ft. for slow-release sources.

Over the years, many northern golf courses have remained open during the winter, allowing play whenever golfers have elected to brave the elements. Unfortunately, a significant amount of winter play will have a very negative

Pine needle mulch maintains green color and prevents winter desiccation at the Lexington Golf Club, Massachusetts.

effect on putting green turf; it is not recommended. Because of the wear injury caused by walking with spikes over frozen grass and the compaction caused by allowing traffic on saturated soils during winter thaws, it may take weeks or months longer to bring greens into top shape. If the golf course is to be left open during the winter, it is best to establish temporary greens during the fall to be used until the following spring. If this is not possible, then, at the very minimum, request that golfers wear spikeless shoes for winter play.

Occasionally, greens are mulched for the winter with pine needles, pine boughs or some other non-compacting material. Several inches of mulch is placed over the turf in late fall and removed or thinned when air temperatures begin to climb above freezing in late winter. Care must be taken to remove the mulch early enough to avoid smothering the turf. The practice of mulching greens is generally not recommended, but can be tried on problem greens or in areas where desiccation is often a problem.

Another technique that is used sometimes involves placing sheets of clear, ventilated plastic over the greens during early spring. The plastic acts as a greenhouse, artificially warming the air and soil in the vicinity of the turf and promoting earlier greenup and growth. Again, care must be taken to remove the plastic if the air temperature becomes too high during the day.

As already noted, heavy fertilization and frequent irrigation of greens should be avoided during the spring. Too much fertilizer inhibits root development, encourages *Poa annua* establishment, and may cause an explosion of topgrowth when growing conditions become ideal. Frequent irrigation discourages good root growth and promotes crabgrass and *Poa annua* germination and establishment. Depending on weather conditions, however, a certain amount of fertilizer and irrigation may be desirable during the spring.

Moderately heavy but infrequent irrigation is called for during extended periods of spring drought, because turfgrass roots will not grow in a bone-dry medium. Although heavy applications of granular fertilizers will be ineffective while soil temperatures are still quite low, several light applications of liquid fertilizer may be beneficial in providing more color without forcing excessive growth. Liquid fertilizers, which are absorbed foliarly, are not dependent upon warm soil temperatures for uptake and utilization. As a result, small amounts of actual nutrients are all that is necessary to achieve an acceptable degree of greenup. Apply about 1/16-1/8 lb. N/1000 sq. ft., plus iron and other micronutrients if desired, on a two- to three-week schedule beginning in early spring after topgrowth resumes.

Playability Is Most Important

After all is said and done with respect to encouraging early spring greenup, the question remains as to why golfers place so much emphasis on the color of the turf during the early part of the golfing season. Shouldn't *playability* be the key concern at this time of year? To some, perhaps dark color is indicative of good health and playability, but this is often not the case. It is not hard to find examples of dark green putting turf which lacks a good root system and is too succulent, bumpy and slow.

Perhaps the very best way to deal with golfers' complaints about the lack of early spring color and growth is to provide as smooth and true a putting surface as can be obtained at that time, and explain that forcing growth with fertilizer and water would be detrimental as the season progresses. Various grooming techniques can be utilized to smooth the putting surface during the spring, including the use of combs, brushes and Wiehle rollers on greensmowers. Light, frequent verticutting should be done to eliminate excess leafiness and grain. Finally, several light topdressing applications, beginning as soon as the greens have dried out enough to accommodate the weight of the topdresser, should be made to provide the best possible putting surfaces. An added benefit of topdressing is that a dark colored material applied to the surface will tend to absorb more of the sun's heat, resulting in earlier spring greenup.

In summary, golfers' complaints about poor spring color and growth plague many golf course superintendents in northern regions. Color has always been overemphasized as a criterion for judging golf course turf quality, but this is slowly changing as golfers become more aware of the importance of playing conditions. By following the above recommendations for promoting earlier greenup and by providing a smooth, true putting surface, many of the concerns about early spring color and growth may disappear.

The Problems of Puffiness In Putting Greens

by DR. RALPH ENGEL
Rutgers University, New Brunswick, N.J.

ON OCCASIONS, bentgrass and *Poa annua* greens develop soft, puffy qualities that tend to ridge or buckle into a slightly higher position than established by the mower. The loose, dense, poorly rooted growth makes a poor putting surface. This slight unevenness occasionally enables the mower to grab chunks of the soft, puffy turf and it scalps or gouges the surface. This produces a poor green. Thick, vigorous growth, poor roots, and possibly certain mowing practices are probably the causes.

Generous watering, nitrogen, and ideal weather conditions seem logical causes of this puffiness. A nitrogen study on bentgrass, conducted for other purposes, developed this characteristic in varying amounts after a period of four years of treatments. The mixed turf of Penncross/Seaside was mowed with a heavier type single-unit green mower at ¼-inch cut three times a week. Rainfall from March through September ranged from 2.4 to 4.9 inches per month. During continued dryness, ½ inch of water was applied three times per week. Cultivation and topdressing were used annually. Fungicides were applied at approximately two- to three-week intervals; this program prevented severe disease injury.

Results of puffiness ratings were made on the nitrogen plots over a five-year period and were replicated three times. These are given in Tables 1 and 2.

In Table 1, note that with the two sources of nitrogen, an annual rate of eight pounds nitrogen per 1000 square feet showed more than twice the amount of puffiness observed with four pounds nitrogen per year. Steady or cool-season fertilization appeared to cause more puffiness than warm-weather applications. Significant amounts of mower scalping had developed by the ninth year. Again, the problem was more severe with the higher rates of nitrogen and appeared to be associated with greater nitrogen stimulation.

Puffiness ratings are given for three nitrogen sources at eight pounds of nitrogen (Table 2). Activated sludge that also supplies phosphorus and some trace nutrients caused less puffiness than the nitrogen treatments with urea and appeared to give less than urea-formaldehyde. Nitrogen applications in cool weather increased puffiness. Mower scalping ratings had their lowest reading on the activated sludge plots in warm weather.

General comments on puffiness of bentgrass turf might be summarized as follows:

1. In test plots, expression of puffiness occurred with more vigorous growth from more generous nitrogen use.

2. Puffiness led to mower injury as the turf aged. This result is logical. Older bentgrass plants tend to have weak roots, as their proneness to desiccation or summer injury has often indicated.

3. The ingredients for puffiness on greens appear to be thick topgrowth and weak roots. Such factors as cool, ideal growing weather, generous nitrogen and weak growth of older plants are suggested by both the test results and by our observations. This does not preclude involvement of other factors such as abundant soil moisture.

4. The test results did not permit evaluation on cutting height influence. It is expected that closer mowing does not permit as much puffiness as higher mowing or at least it is less noticeable. Yet, it seems high nitrogen and aged turf plants encourage this condition even in very closely cut turf.

5. Future development of improved bentgrass types should include varieties

"Teased" Poa annua *from a putting green.*

that are less prone to puffy greens surfaces.

Suggestions for greens troubled with puffiness are:

- Use minimal amounts of nitrogen, particularly just before and during cool, ideal growing weather.
- Practice frequent, light vertical mowing during the "puffy season." *Light* vertical mowing is emphasized — just a touch to the grass blade.
- Light topdressings (and perhaps cultivation) to rejuvenate the turf. This will reduce puffiness and produce better putting conditions. Furthermore, the use of minimal nitrogen complements our recommendations for reducing injury from disease and temperature extremes.

TABLE 1.
Effect of Nitrogen Rate on Puffiness and Mower Scalping of Bentgrass Turf

Nitrogen Source	Season of Application (1)	Nitrogen Rate lbs/M/year	Average of Five Ratings from 1964 thru 1969 (%)	Mower Scalping 9th year (2) (%)
urea	steady	8	18	16
urea	steady	4	8	4
urea	cool	8	22	19
urea	cool	4	7	8
activated sludge	steady	8	9	11
activated sludge	steady	4	3	1
activated sludge	warm	8	6	4
activated sludge	warm	4	2	2

(1) Repeat applications in the respective seasons.
(2) Average of 2 ratings with accumulated mower damage in the 9th year.

TABLE 2.
Effect of Nitrogen Source on Puffiness and Mower Scalping of Bentgrass

Nitrogen Source	Season of Application (1)	Average of Five Puffiness Ratings (%)	Mower Scalping (%)
activated sludge	steady	9	11
activated sludge	warm	6	4
urea	steady	18	16
urea	cool	22	19
ureaform	steady	7	14
ureaform	cool	13	15
ureaform	warm	9	12
ureaform	March	13	11
ureaform	September	6	13

(1) Repeat applications totaled 8 lbs. N/M/year — except the March and September ureaform treatments, which were single application.

News Notes For Early Summer

Bill Bengeyfield Named Green Section National Director

William H. Bengeyfield, who joined the USGA Staff in 1954, was named National Director for the Green Section on February 1, 1982. He served for 26 years as Western Director and 15 years of that as Editor of the GREEN SECTION RECORD. He replaces Alexander M. Radko, who retired November 30, 1981, after 35 years of service.

In his new duties, Bengeyfield will supervise the USGA's 12-man Green Section staff, continue to serve as Editor of the RECORD and have overall responsibilities for course preparations at USGA Championships. He will also participate in the activities of the new USGA Turfgrass Research Advisory Committee.

Bengeyfield returns to Green Section work after an absence of four years. In 1978, he became Director of Golf Course and Grounds Maintenance at the 36-hole golf and recreation complex at Industry Hills, California. He retains his affiliation at Industry Hills.

Bill Brewer Resigns

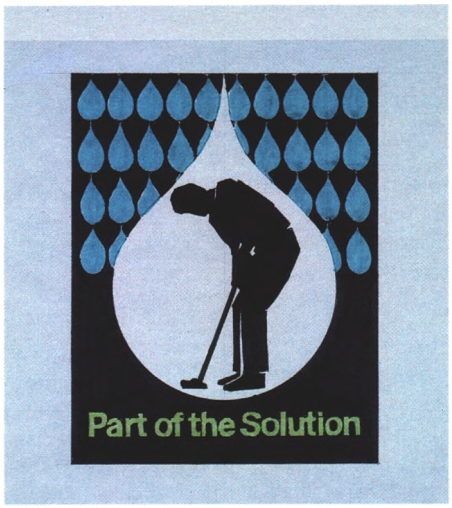
Since 1976, William S. Brewer, Jr., has been a Green Section senior agronomist for the Northeastern Region. He announced his resignation in early February. In following new pursuits, the entire staff wishes him well.

A New Agronomist and New Green Section Office in Florida

Steve M. Batten, master's degree graduate of Oklahoma State University, joined the USGA Green Section staff in February, 1982. Prior to his Green Section assignment, Steve worked at Texas A&M University as research associate for Dr. James B. Beard. Not only did his work include extensive turfgrass weed research and cultivar evaluation, but he was also project leader for turfgrass research for the state of Texas. An excellent artist, Steve has been illustrator of three turfgrass books, including the latest one sponsored by the USGA. He has been involved in golf course maintenance or turf research for the past 20 years.

(Continued on page 12)

Marshaling the Forces of The National Golf Community



by JAMES E. McLOUGHLIN
Executive Director, GCSAA

IT IS ONE of the fascinating paradoxes and ironies in the history of any sport. For decades, golf has been a worthy vehicle for many others to use to raise millions of dollars for charity and to serve as a social-business medium. Golf has never focused on its own needs — until now. How is golf planning to cope with the wide range of challenges it faces today? Without question, it is facing one of its severest tests, because every problem translates into economic pressure, and economic pressures are rampant today.

As golf marshals its forces and begins to measure its capabilities, it is finding it has considerable collective clout. Imagine these nine national golf organizations working in concert:

The USGA
The American Society of Golf Course Architects
The Club Managers Association
The Golf Course Builders Association
The Golf Course Superintendents Association
The LPGA
The National Club Association
The National Golf Foundation
The PGA

Their added financial resource, access to media, access to government, educational and communications capabilities, and just plain people contacts are staggering. We are encouraged.

All of this Allied resource has been channeled into five task-force projects that are now underway:

1. The Task Force on Government Relations: The objective here is to establish a legitimate presence for golf in Washington. Previous golf activity in this area has been inconsistent and sometimes highly competitive. The National Club Association will represent golf's interests in Washington beginning this year. There is good expectation for success.

2. The Task Force to Expand Participation in The Game: Present programs by the PGA in the Wee Links and Klubs For Kids areas are duly noted and appreciated. New targeting will focus on encouraging the infrequent player and the junior golfer to play more often. It is felt that the family unit holds the key to expanded golf play in this country.

3. The Task Force on Marketing Research: If this is the first time golf has attempted to help itself, it is also the first time it will look at itself to measure market size, attitudes, media influence, product influence and demo-

graphic potential. Because golf will traverse virgin territory here, very positive results are expected that will constructively and immediately feed the industry's education and management programs. The guesswork will, literally, be taken out of golf marketing.

4. The Task Force on Coordinated Education: Many organizations in golf are developing new educational programs to meet the obvious challenges of the 1980s. Excitement surrounds these efforts. So does duplication! Golf cannot afford to waste and dissipate its most precious commodity — education. This Task Force will monitor the industry's educational process and encourage cooperative effort where appropriate.

5. The Task Force on Technical Research: The objectives here are several and demanding: to improve turfgrass varieties, to improve water utilization practices and to establish better controls in insect, disease and weed areas. Recognizing that golf primarily waters itself today from the increasingly precious 1 percent potable world water supply and does not yet utilize effectively the 99 percent effluent/waste water supply — golf has been labeled one of the "bad guys." One of the early goals of this Task Force is to effect this transfer, to make golf a part of the solution and not part of the problem in the water consumption area.

Funding these five Task Force projects might seem to be an insurmountable problem. Not really. Because golf has never asked for financial help on its own behalf before, a sizeable untapped reservoir sits and waits for the energetic and committed supporters of the game to dive into. Never before in its history has golf's potential for fund raising been so right. Nothing will come easily. But with hard work, it is possible.

TO THIS POINT, everything I have said would seem to be encouraging. This is true. There is, however, a small but very real "hooker" caught within golf's constructive planning. In one word, the hooker is "competition"; competition between and among the allied golf associations themselves to deliver individual programs. To a large extent, this is a natural process that should not be condemned. However, the strong urge by any national golf association to dominate the scene is a real threat to the continued effectiveness of the allied group and the building of golf's collective clout. Unless concern for the welfare for the game of golf is kept uppermost within the thinking and planning of each golf association, all the potential referred to within this commentary will be lost.

Golf, therefore, is also facing its first character test and truest moment. If sport is supposed to test the character of man, golf is now testing the character of its own leadership. The allied group must seek and find that delicate balance where it can serve itself and golf. It would be nice to say that we can presume this will happen. The situation is not automatic. Rather, it is one where character will be tested. If golf has taught its true lessons through the years, we will surely pass this test.

MORE NEWS NOTES
(Continued from page 10)

The new Green Section subregional office for the Southeastern Region will be located at 5579 Adair Way, Lake Worth, Florida 33463. The telephone is (305) 968-8146. Steve Batten is highly experienced and ideally located to serve TAS Green Section subscribers in southern Florida. He has settled in and is ready to be of assistance.

A New Green Section Office in Boston

Brian M. Silva, Northeastern Region Agronomist, opened a new subregional Green Section office in April to serve TAS subscribers in the New England area. Turf Advisory Service subscribers in New England may now contact Silva at 236 Goldthwaite Road, Whitinsville, Massachusetts 01855. Telephone (617) 234-6889. The new office is ideally located to serve the large number of USGA Member Clubs in this important section of the Northeast. He would be delighted to hear from you.

Brian Silva is a native of Framingham, Mass., and holds a master's degree in agronomy and turfgrass management from the University of Massachusetts. His father has designed and built golf courses throughout the region. Silva joined the Green Section staff in July, 1981, after serving four years as an instructor at the School of Golf Course Operations, Lake City College, Lake City, Florida.

For Better Golfing Turf There's Nothing Like the Green Section Turfgrass Advisory Service

For over 30 years, the Green Section Turfgrass Advisory Service program has been of tremendous and direct benefit to golf course superintendents and green committees of USGA Member Clubs. In untold cases, one small bit of information given by the visiting Green Section agronomist has saved clubs many times the actual cost of the Service. More important, however, is the significant improvement in golfing turf and playing conditions which results from the consultation of the Green Section's representatives. No small part of this is the authoritative backing he provides to turf management operations.

For 1982, the fee for the Turf Advisory Service visit is $500. This is less than ¼ of 1 percent of most golf course maintenance budgets today. For this small expenditure, the club receives a full half-day visit and tour of the course followed by a written report of all recommendations. The fee also covers full travel expenses for the agronomist (except in certain unusual circumstances). In addition, emergency consultations and other information pertaining to turfgrass management may be obtained at Regional Meetings or by telephone calls to the Regional Green Section offices.

As in the past, the Green Section services are offered for the benefit of golf by the USGA, a non-profit organization. It has no axes to grind and has played a leading role in turfgrass management and research since 1923.

If your club is not already a Turf Advisory Service subscriber, we believe we can be of real service to you in 1982. Contact your nearest Green Section Regional office (please see inside front cover) for full details. Your club can have better turf!

Getting Ready for Summer: Lightning Alert

by DICK GRAY
Superintendent, Crestview Country Club, Kansas

LEE TREVINO'S story of holding a 1-iron over his head for protection during a thunder and lightning storm ("Not even God can hit a 1-iron") isn't fully believed at Crestview Country Club, in Wichita, Kansas. Here the bolts ricochet regularly across the western summer sky. An alarm system for severe weather, especially lightning storms, was authorized by the board early in 1980.

Our first approach was to use the usual centrally located siren. However, this seemed impractical because of the layout of the course. We have 36 holes on one square mile. With occasional strong winds and housing along our fairways, it would be hard to achieve audio coverage over the entire area. The cost for this system was over $6,000.

Our next thought was to section the course into areas that could be covered by a smaller type warning alarm. We selected one signaling device that has 11 tones to choose from merely by changing a circuit board. We then took a sample device to five different locations on the course and plugged it into the 110-volt service at our satellite irrigation controller. The testing program convinced us that this was the best system for coverage of our course. We selected a tone completely different from all emergency vehicles that would be in our area and would not confuse anyone.

The next problem was that of triggering the device from the golf shop to the five locations on the courses. We had power at the controller sites to operate the alarm, but we would have to run a triggering wire to each unit. This would require over three miles of wire and a considerable expense for the installation as well as the wire itself.

To get around the wiring problem, we contacted a local electrical company for alternatives. They came up with a transmitter device which, when modified, would do the job. The transmitter is capable of superimposing a signal on the existing 110-volt line going to each irrigation controller site. A decoder was installed in the circuit of each warning device and, when the signal was received, it would activate the warning system.

The storm warning system is activated by a special key through a timer in order to keep the warning consistent. The alarm sounds for 7½ seconds each time it is activated. The golf shop is in full charge of the warning system and sounds the alarm when weather warrants it. Three alarms means "clear the course." One alarm is the signal for "all clear." The total cost for our system was just under $6,000. It beats a 1-iron.

Richard Gray and one of five siren alarms.

USGA GREEN SECTION RECORD
MAY/JUNE 1982

TURF TWISTERS

FOR A COLLEGE MAJOR

Question: I'm considering a turf management major in college. What is the outlook for new golf course development? (New Hampshire)

Answer: Harry C. Eckhoff, of the National Golf Foundation, recently reported that 149 new golf courses opened last year and, as of January 1, 1982, 340 new ones are currently in some stage of construction. Florida leads the way with 26 new course starts; California, 10; Texas, nine; etc. The only states not reporting activity in golf course development last year were Alaska, Delaware, Rhode Island and South Dakota. Although 1982 is not expected to be an outstanding year, it should show some improvement over 1981. Leading economists expect a modest recovery this year and more stable, non-inflationary growth in 1983.

IT'S WORTH A TRY

Question: Any new information on how to control fairy rings? (Illinois)

Answer: Yes! (Something old or something new — it's worth a try and it's up to you.) Recent field experience (not supported by any specific research) and some old-timers have reported that additions of hydrated lime at 1 lb./1000 sq. ft. applied to the active rings and lightly watered seem to retard the growth of the fairy ring organism. With the thatch generally being acidic, often independent of soil pH, the lime changes this to a slightly alkaline value which, it is thought, slows the growth of the organism. When tried on some golf courses, this seems to work. However, as with the nature of this difficult problem, on other golf courses, it does not work. In any case, with no known cure, at least now there is one more thing you can try to control fairy rings: light rates of hydrated lime applied to the rings. It's worth a try.

TO JUST NICK THE BLADE

Question: Somehow my bentgrass greens and tees have all become rather fluffy. I had no opportunity to work on them last fall. What can be done now? (New York)

Answer: Spring is the time when grain and fluffy growth are most pronounced. You are right on time! Light and frequent vertical mowing, once steady growth has begun, is the answer. Set the vertical mower for *a very light cut*; just nick the grass blades. Do not cut into the crown. A light, double vertical mowing several times during the spring should work wonders. And, don't forget to start in with *light*, monthly topdressings, too.