JULY 1975

USGA GREEN SECTION RECORD

A Publication on Turf Management
by the United States Golf Association

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The 1970 United States Open Championship at Hazeltine National Golf Club.

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The Agronomics of Course Preparation for Major Championships

by ALEXANDER M. RADKO, Eastern Director and
WILLIAM H. BENGEYFIELD, Western Director, USGA Green Section

Clubs that entertain the challenge of major championships enjoy a special competitive relationship. Pride permeates every aspect of a great club's existence. The club, the membership, the golf test, the employees all feel a special kinship.

> "Our course is something special and interest shown by our members and guests tells us so. We challenge players of every calibre. We're a championship golf course and when we do have a national tournament, we don't need to make any extraordinary effort to accommodate it, we just put on our 'Sunday Best' and proceed."

This has been said in many ways by many golf course superintendents—past and present. The great courses are there, the challenge is there, but what makes it a great test is that every challenging feature of the course is brought into play when the major championships are held. The course is usually set up just as the architect designed it—no major changes, normally, just some tightening up here and careful study of every hole to get the most out of every foot of terrain and every hazard.

Joseph C. Dey, Jr., retired Commissioner of the Tournament Players Division of the PGA and former USGA Executive Director, has said, "There are some solid principles to guide you, whether the championship is the U.S. Open or the Nassau Open, the basic idea is the same—you are going to help determine a champion golfer . . . you are going to prepare a testing ground that will reward skill . . ."[1]

For major championships, representatives of the sponsoring organizations work with club officials far in advance of the scheduled event, sometimes two years in advance. These officials and committees finalize decisions as to how the course should play for that specific championship.

Quite obviously, preparations for the United States Open or PGA Championship are directed towards a more challenging test than one set up for the Junior Amateur. The Open Championship places a premium on accuracy and skill with the use of every club in the bag.

A very important part of that challenge is the turfgrass cover, how the turf plays—things that our best amateur and professional golfers look for—tight, firm fairway lies; firm, fast greens; close-cropped teeing grounds; and above all, a uniformity of condition that inspires confidence in predicting the way the ball will act. Simply stated, conditions must

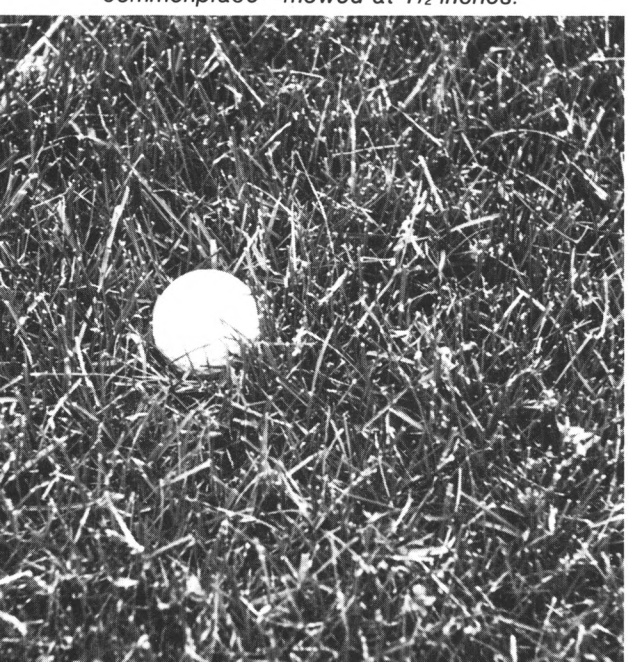
allow for the possibility of finesse throughout the prime target zone and provide a suitable penalty for all who stray from it. This is the role of agronomic preparation. This is where the golf course superintendent and consulting agronomists put their heads together to prescribe the best route to follow toward that end.

Richard S. Tufts, past President of the USGA, has said, in effect, that things need not be so uniform that the swing be automatic. A golfer must expect variations caused by terrain, by constant use, and the changing conditions of growing things. That's all part of the challenge, "It's the rub of the green aspect that makes golf the challenging and exciting game that it is." As a passing comment, he also said, "Fairways today are as good as some of the greens I used to putt on in my earlier days of golf."

Every golf course superintendent worth his salt is conscious of the responsibility of public image. Major championships receive wide coverage in the news media and television. The superintendent wants his course to show to best advantage to interested spectators from all walks of life, and yet he knows that turfgrass appearance and excellence of playing quality are not always the same. Dr. Fred V. Grau said it best: "Golf is played on turf, not color."

Those involved in course preparation are furnished a copy of the *USGA Golf Championship Manual* for guidance. This manual defines the guidelines and only that. It does not project the "feel" for making the field adjustments necessary for a great test of golf. This is the job of the agronomic team—the turfgrass specialists—who tailor the turf to the terrain, weather and growth conditions. For example, the set of the mower doesn't insure that turf will be cut at that height. When you deal with fractions of an inch, other factors come sharply into focus. The thatch, the condition of the machine, rate of growth, climate, the experience of the man mowing, plant turgidity, and even the time of day all make a difference in efficiency of cut. Adjustments must be made! If there is any question, one great equalizer is frequency of cut. If you step up the mowing schedule during the tournament, it could balance off some of the weaknesses that otherwise would be prominent. The rule of thumb is to step up the mowing process during any championship. The second rule is to mow the turf as close as the grass permits without risking permanent injury.

As late as the 1950s fairways like this were commonplace—mowed at 1½ inches.



Fairways mowed as close to ½ inch as possible allow unobstructed contact of club and ball.

GREENS

Golfers have said it in many ways: "The difference between the winner and the rest of the field is putting!" From the tee and through the green their abilities are fairly equal, but the one who uses the fewest strokes on the greens usually wins! What makes an exceptional green? It must be firm and fast, the ball must roll true and take the break of the terrain only; it should be influenced by top growth of grass little or not at all. In British terms, the greens must be *keen.*

Excellent greens require that—

1) The height of cut be 3/16-inch or less. To insure this, greens must be cut daily for several weeks prior to the completion of the competition and double-cut *every morning* of the tournament, including the practice rounds. Every day the greens should be cut in two directions, the second cut at right angle to the first direction of cut. This also refers to the practice green.

2) There should be approximately ½ inch of thatch to allow the ball to take predictable action when properly struck to the green. Thatch control is a continuous process of top-dressing, vertical mowing, thatching, daily mowing, proper nutrition, good watering techniques, etc. Thatch should be brought under control for reasons of general good health the

Bunkers with lip toward green side prevent putting out of sand.

year-around.

3) Top-dressing material should contain a high percentage of sand of a type that measures between 1/4 and 1/2 mm in size. (See Figure 1) No particles should be larger than 1 mm, and only a small percentage below 1/4 mm. All top-dressing material should permeate the turf and work its way down to the soil line below. This is possible only if light applications are made frequently. For minimal thatch, approximately 1/3 cubic yard of top-dressing every three weeks is advised while the grass is actively growing. In most cool season grass areas, this means during the spring, fall and early winter; in bermudagrass areas, this means during the spring, fall and summer.

4) Vertical mowing is required weekly when the grass is actively growing. The vertical mower must be set so that the revolving blades just touch the turf surface and remove decumbent blades. It should not gouge or scalp the putting surface. As with normal mowing, the direction of cut should change with every cut.

5) The nutrition program, lime and fertilizer, should be one of moderation for months prior to the competition. Hungry greens cause fewer problems, and they also make for truer, faster greens. Applications of fertilizer to putting surfaces should not exceed 1/4 pound nitrogen per 1,000 square feet at any time during the current year of a scheduled major championship. It is far better to apply four applications at 1/4 pound of nitrogen over an extended period than higher rates of nitrogen less frequently. Ground limestone also must be applied in moderation otherwise a layer detrimental to water movement will form over the soil line. Remember that color could be improved by using light applications of iron sulfate in place of more nitrogen.

6) Greens rarely should be aerated within six months of a major tournament because of the possibility of "pimpling" of the putting surfaces. By "pimpling" we mean stronger grass growth occurs over aeration holes and therefore a "roller coaster" effect results. Only the most troublesome greens might require aeration within six months of a tournament, but only if there is fear that some turf loss would occur if not aerated.

7) The watering of greens is a precise operation and it differs with every course. The rule of thumb is that greens should be firm. This means that they should be watered moderately and carefully so that uniform amounts are applied in order that every portion of the putting surface will provide uniform ball reaction. The least amount of water that you can apply and yet keep greens alive is the recommended program for greens during championships.

8) Standard preventive disease and insect control programs should be followed at all times on greens, not only for major championships. If extraordinary problems arise, they should be brought to the immediate attention of all involved in the turfgrass phase of course preparation.

9) The collar around greens generally measures approximately 36 inches and should be mowed between 1/2 and 5/8 inch. The collar can be aerated at any time up to six weeks before a championship if the turf is in need of strengthening. Collars should be managed as greens, except that they may require slightly more hand watering to keep them from drawing water from the edge of the putting surface. If collars are watered efficiently, greens tend to dry-out less at their perimeters.

TEES

The teeing area should be mowed at 1/2 inch or less for the tournament. Tees should be kept on the dry side, they should be watered sparingly, if at all during the competition. Clippings should be removed with each mowing. Tees otherwise should be managed on the same program as greens, except they may require slightly more fertilizer. However, they should never be overstimulated to the point where they become soft and more prone to injury.

Tees may be aerated at any convenient time.

Top-dressing is important to smooth and level tees. Top-dressing can be applied lightly and frequently, similar to the program followed on greens.

Since tees on par-3 holes will take abnormal divot abuse during most of the year, it is very important to keep play away from the area to be used during the championship for at least one month prior to the competition.

FAIRWAYS AND ROUGHS

Undoubtedly, the outline of fairways will be altered to place a premium on accuracy for most major championships. Where fairways are narrowed, grasses will produce a very thick stand when allowed to grow to rough height. One compensating factor, however, is that there will usually be a swatch of intermediate rough at approximately 2 inches immediately adjacent to fairways, the remainder will be 4 inches or higher, depending upon committee decision. In order to assure rough growth to designated height, it is important to aerate, lime if

Figure 1
Sand Particle Size Classification Table

	Tyler Scale (ASTM)* (Mesh)	U.S. (Sieve) No. (NBS)**	Sieve Opening mm.	Textural Name	
	4	4	4.76		
	5	5	4.00		
	6	6	3.36	Gravel	
	7	7	2.83		
	8	8	2.38		
	9	10	2.00		
	10	12	1.68		
	12	14	1.41	Very Coarse Sand	
	14	16	1.19		
	16	18	1.00		
Range	20	20	.84	Coarse Sand	Range For
For	24	25	.71		Soil Mixes
Bunker	28	30	.59		And Top-
Use					Dressing
	32	35	.50		
	35	40	.42	Medium Sand	
	42	45	.35		
	48	50	.30		
	60	60	.25		
	65	70	.21		
	80	80	.18		
	100	100	.15	Fine Sand	
	115	120	.13		
	150	140	.11		
	170	170	.09		
	200	200	.07	Very Fine Sand	
	250	230	.06		
	270	270	.05		
	325	325	.04		

* American Standard Testing Materials

** National Bureau of Standards

Ideally, a minimum of 75% medium sand should make up the sand for soil mixes and for bunker use. The bunker sand particles should be sharp, angular, while the sand for soil mixes preferably should be round, if obtainable.

soil tests indicate the need, and to fertilize the roughs adequately for each of the two years prior to the tournament. The swath designated to be mowed at 2 inches could be fertilized only when applications are made to fairways. It is also important to prepare for the primary rough cut by halting mowing operations six weeks in advance of the tournament week. Much depends on the rainfall pattern unless roughs are normally irrigated. It is better to stop mowing roughs early, rather than too late, because the rough may be cut at a specified height prior to the tournament if growth becomes too great.

Fairways should be mowed every day during the competition. The height of cut should be as close to 1/2 inch as the terrain and grass type permits. Fairways should be cross-cut several times during the six-month period prior to the championship date. At minimum, four cross-cuts are advised as follows: one right to left, the next left to right, a third diagonally left to right, and a fourth diagonally right to left. The object is to leave no long grass in swales or depressions within the fairway area.

If fairways need strengthening in some places, they should be renovated and/or overseeded the year prior to the competition. Such areas could be slopes and/or mounds that tend to weaken, both ends of the fairway where tractor turning bruises the turf, makes wheel marks, etc. One remedy for the latter ailment is to use smaller and lighter machines to mow each end of fairways; a second remedy is to alter the turning area with each mowing so that the larger units are not always turning in the same place.

If any area requires sod within two weeks of the competition, the sod should be cut in an 18-inch swath at a depth of 2 to 3 inches so that it will prove stable underfoot. The sod also should be laid so that the seams lie in the direction of the green. Seams should be top-dressed with soil to smooth them to the point where a ball will not nestle in a rut below the turf level. If a month's time or more is available, routine sod work could be performed, and with special care the sod should knit well in that time.

The fairway turf should be weed-free, free of clover and broadleaf weeds especially. Herbicides such as MCPP, 2,4-D and Dicamba assure good weed control when properly used. These herbicides should be applied far enough in advance so that voids left by dying weeds will fill-in with turf from surrounding areas *or* through renovation.

Fairways should be fertilized to conform with the best practices for the region involved. Since the time of year the championship is held will have a strong bearing on turf performance, the program should be adjusted to have the turfgrasses peak during the week of the competition. This sort of control can best be kept if grasses are fertilized lightly but more frequently. For example, if your goal is 88 pounds of nitrogen per acre prior to the tournament date, the 88 pounds could be divided into four treatments of 22 pounds per application. This way, you always have the option to add a little more or reduce the final application if observation and performance so dictates.

A preventive disease control program should be followed on fairways to insure healthful turfgrass cover and density.

BUNKERS

Sand for bunkers should be washed sand, free of clay or silt, and should preferably conform to the specifications defined in Figure 1. Sharp (angular) sand is best because it is more stable. Round sand is "shifty" underfoot.

Sand should measure 4 to 6 inches in depth, except on facings where it should be less to prevent balls from becoming lost. If fresh sand is added to bunkers, it should be done at least a month before the competition. If the full 4 to 6 inches is brought into place at one time, it should be done 4 to 6 months in advance of the tournament. The new sand should be watered, if there's no rainfall, for proper settling.

Players should not be able to putt out of bunkers. To prevent this, a "lip" measuring 3 inches or more should be created facing the putting surface. Bunkers are usually edged in order to sharply define the hazard, and the sand at the back of most bunkers should be raked to meet the level of grass and terrain.

POST TOURNAMENT CONDITIONS

After the competition is over, we recommend that the fairway lines be kept intact until the end of the season when it is safe to make cutting adjustments. If cut down and realigned to the original width and contour immediately after the tournament, chances are the grass will turn brown and die. It will look unsightly, and those who are not informed will believe the course has fallen apart after the tournament. In many instances, the membership prefers to keep the tournament course intact, except for the prime rough, for a few months, to compare their efforts against the tournament player's score. The prime rough could safely be reduced an inch per cutting until it reaches a height of 3 inches, where it should be kept until favorable weather conditions permit mowing roughs closer, if desired.

These are the major points of agronomic concern in any major tournament. In addition to the foregoing, there are a number of other details that must be attended to, with committees and officials. Don't cut yourself off from one of the most rewarding times a professional turf man can experience. Seek out and work with the key tournament people. Enjoy the event and the contribution you are making to it. It should be one of the most memorable times in your professional career.

[1] Preparing Your Course For Tournament Play; March, 1973 *Green Section Record.*

Golf Course Economy— A Time to Review

Budgeting—Carefully planning one's actions.

by BOB ADAMS, Rochelle Country Club, Rochelle, Ill.

One of the most exciting challenges that face all of us who are members of this turf industry is the ability to produce a defined output within a framework of economic constraints. This indeed is a challenge and not a nightmare, as many contend it is. The economics of the situation is singularly the most important measure that any of us must confront. Whether one is in the "business" as a superintendent, consultant, product sales representative, or university specialist, we all must realize that we are under the scrutiny of financial analysis.

A retrospective view of the growth of our industry shows remarkable advancements in both scientific and technological fronts. These changes really began shortly after World War II with the introduction of new chemicals, turf varieties, equipment and cultural practices. The 1950s and 1960s initiated the momentum. However, the major advancements have occurred in just the last five years and will continue in the foreseeable future. It is of interest to note that over 90 colleges and universities presently support programs in turfgrass management. This number multiplies many-fold when we add to the list both manufacturers and turf associations. The dissemination of knowledge in turfgrass science and culture is impressive, to say the least.

It is important to add that growth, by itself, is not a doctrine that is to be interpreted as the ideal state. What we must examine are the various components of our growth; this is where one develops a full respect for the industry. The knowledge of the factors that influence the performance of our end product, turf, has been, and will be, the continued foundation for our future success.

Those factors that have been most productive to our profession have been in the area of research and development. Here, universities, golf foundations and manufacturers have performed extremely well. The availability of information that has come forth from these various groups greatly aids the performance of this industry's participants.

One factor which constitutes a major component of the success formula is in the area of financial management. Unfortunately, this area has only been briefly acknowledged in our own literature. Here, like in many other cases, financial management must fall into the realm of a superintendent's responsibility. Finance is an integral part of the greater system. If a superintendent does not have a basic understanding of its usefulness and purpose, he loses much control over the direction of his efforts. It must be pointed out that financial management is not to be viewed as a restrictive force; rather, quite the opposite. Financial planning should be used to guide and direct maintenance objectives.

RECESSION OR RE-EXAMINATION?

There has been much discussion in the last year about our economic problems. Nationally, we see a

frightening unemployment picture with unprecedented inflation. In many panic button is on and moods are gloomy of these national problems have made their way into the golf course operation. We have seen shortages and several increased prices in equipment and supplies. This uncertainty of the future diminishes confidence levels. It becomes increasingly easy to complain about the problems; and we tend to offer quick solutions to an extremely complex situation. Very little can be accomplished by placing all the blame on the economy, for it is a nebulous entity and often defies explanation.

Rather than striking out at the larger economy of our nation, let's re-examine our golf course operation and see if we can begin intelligent economy in our own immediate environment. Hopefully, there is no better time than now to begin to initiate a tightening of the belt in one's golf course program. A short-term defensive attitude that uses the economy as the major stumbling block is very much in opposition to the prevalent belief that a superintendent is an agent over his own destiny.

A tightening of the belt is not to be construed as a reduction in one's dollar budget. Rather, it advocates studying the various accounts that constitute one's budget and deciding whether expenses can be reduced or added to in procuring the defined output. If we can realize that expenses are incurred to produce a desired outcome, and not the reverse, we can begin to approach financial planning and budgeting from the right direction. It is incorrect to take last year's budget, add in a percentage increase, and assume that will work for the year. It obviously can be done, but in so doing an individual does not plan his actions. He develops a system of restrictions, rather than directions.

THE GOLF COURSE IS A BUSINESS

A business enterprise parallels the golf course operation very similarly. A company puts together a series of related costs in an attempt to produce a desired output—long run profitable sales. The different costs might include a salesman, an automobile, advertising, telephone, etc. These all represent costs (inputs) that will be matched against resulting revenues (output). The business manager, in analyzing performance, may decide to shift emphasis in one or more of these inputs in an attempt to maximize the company's profitability. He has used his costs, hopefully in the right mix, to plan for the following year's performance. The similarity between the golf course superintendent and the business manager is striking.

Recommendations, and subsequent action, can occur only after we submit our course to a thorough cost/benefit examination. This approach simply analyzes various expenses in relation to the benefit that results from incurring these costs. The benefit may either take the form of an actual cost savings (i.e., in the long run an investment in a triplex greensmower will reduce labor costs and equipment maintenance), or the benefit might be measured in greater utility to the golf course's appearance (i.e., the use of chemicals to control dollar spot). Any investment decision, or cultural program, can be formulated utilizing this approach.

INDUSTRY EFFORT— WE'RE ALL INVOLVED

It must be clear that understanding the relevant cost factors is not the total responsibility of the superintendent. It is truly a responsibility that falls upon our entire industry. All of us must have an appreciation for the financial implications that a product, service, or cultural recommendation has on the golf course operation.

The superintendent is immersed within a dynamic environment that is continuously changing. It requires immediate decisions as well as long range planning. To such a great extent we have the technology available from within our industry. The free exchange of practical scientific finds has always prevailed. What we must come to learn is the importance of understanding the complete system. This involves the efficient and effective utilization of all available resources to produce a desired level of turf culture; and the productivity of these efforts has never been so important.

Biographical Sketch on Bob Adams:

Bob Adams is a member of Rochelle Country Club, Rochelle, Illinois. He received his Master's Degree in Business Administration from Michigan State University, majoring in Finance. While at MSU, he worked part time in turf research and attended classes in Turfgrass Management.

During high school and college, Bob spent his summers working on the maintenance crew of two Detroit area golf courses. Currently, he is with the Northrup, King Seed Company.

Cupping Area— Where Does It Go?

by WILLIAM G. BUCHANAN,
Agronomist, USGA Green Section

Ideas have drastically changed over the last 15 years on how a green should be treated and built. Around the turn of the century the putting green was considered a part of the fair green; the putting surface was rather closely clipped by sheep which were the only lawn mowers that were used on the greens at that time. Until the invention of the lawn mower, putting greens were not treated differently from any other portion of the golf course. A periodical published in 1914 by Fred Taylor stated, "Putting greens were not especially planted or made. They were merely parts of the fair green because the natural conformation of the ground at this point was suited to putting."

Better golfing equipment and lawn mowers have changed a relatively simple approach to the golf course and its maintenance to a business where $100,000 a year maintenance budgets are commonplace and putting green construction takes a major portion of the golf course construction budget. This drastic change in the way that golf has evolved makes it extremely important that a golf course be maintained at its peak through the golfing season, whether that season is a 5-month season or a 12-month season.

In the past few years, it seems private clubs are receiving more play than in the years past. This is a combination of the clubs accepting more members and the members staying home and playing more rounds at their home club.

More play is a very good thing for the club, but it can create serious problems for the course superintendent. Many of the older clubs, those built more than 25 years ago, have small greens that were built for relatively small memberships. Since golf has enjoyed expanding popularity, many of these club's membership rolls have doubled and the old small greens with limited cupping area have suffered accordingly.

Cupping area and green size are not necessarily synonymous. Times have drastically changed since greens were "not especially planted or made." Greens today are shaped and sculptured by the architect and they call for greater putting skill. Take for instance a green with 7,500 square feet of putting surface. If the green is relatively flat or of a constant slope where essentially all of it may be used for cupping, there is between 5,381 and 5,779 square feet available for cupping. (The USGA states that the cup should be placed no closer than five paces from the edge of the green and that the area two to three feet in radius surrounding the cup should not have any change in contour.) The differences in area remaining is that some people take shorter paces than others; these figures are based on a person's five paces ranging between 12 and 15 feet. A 5,000-

A large green with over 8,000 square feet of putting surface, with only 2,200 square feet of useable cupping area.

Green restored to original size and shape—note front left of green.

square foot green, which is close to the national average, will have between 3,296 and 3,608 square feet available for cupping.

If the greens happen to be bi-level or have severe contours, much more useable cupping area is lost. Not only are the contours lost for cupping space, but an additional three feet on either side of the contour is lost because of the problem of the putting surface's grade changing within a three-foot radius of the cup.

Restricted cupping areas can lead to a variety of problems, among them compaction and turf wear.

Compaction can affect the turf in so many ways. It destroys soil structure, restricts air and water movement through the soil profile and greatly restricts root growth and plant development. It can make the green so hard that it becomes impossible either to satisfy the golfer or to maintain quality turf. Aeration several times a year, spiking regularly through the year, and a good top-dressing program can help in relieving the compaction problem so long as weather conditions are favorable.

Turfgrass wear is another problem. We can relieve compaction, encourage growth, and pray, but so long as the grass is subjected to constant wear, it will have no chance for complete recovery. When the cupping area is limited, the turf is subjected to constant wear because the green is the one place where everyone playing the course must walk. The cupping area receives the most concentrated traffic of all. Everyone is supposed to hole out on each hole. Everyone has to retrieve his ball from the hole, and therefore every golfer must make at least one footprint, and possibly two footprints, within a three-foot radius of the hole. This means 12 beautiful spike marks for each footprint. Is there any wonder that the cup location must be changed in most cases on a daily basis?

Turf wear can be masked or covered up by overseeding, top-dressing and fertilizing, but the only real cure is to reduce traffic. It is not very practical to stop play completely for a week or two during the season, although the practice of closing the course each Monday has great merit and gives the turf a slight breather as well as allowing maintenance work to be done. The only additional technique is to try to get the greatest possible number of pin placements on each green.

Cupping area, if not built-in, can be very hard to find. Ideally, greens should be built large enough so the minimum size would handle the maximum expected play. This calls for the officials of the club to anticipate the largest number of members that the club will have and build the course accordingly. Of course any putting green construction on the course should be done to USGA Green Section Putting Green Specifications.

Since not everyone will follow the route of rebuilding all of their greens, there must be another way. This calls for a lot of study and, if possible, referring to the original set of blueprints that were used in building the course. It is very likely that, for one reason or another, your present putting surfaces are smaller than those maintained a few years ago. Economic cutbacks may have reduced some putting surfaces. Maintenance problems such as drainage offer another reason for reducing green size. But the main reason for the smaller putting surfaces is that the men operating the greens mowers, in an attempt to avoid scalping the fringe area at the perimeter, have gradually inched in. It does not take long to lose considerable space on a green if the mowerman

misses the cut by 1/8 to 1/4 inch each time the green is mowed. A green can lose six inches to a foot every year from its radius as a result of this practice. The reduction of the putting surface can be so gradual that it can very easily go unnoticed. When this occurs, the greens slowly lose their irregular shapes and all start to look like circles. A check of old blueprints or pictures may lead to some very interesting findings.

If these original references are not available, one could use a soil probe and probe outwardly around the edges of the putting surface until distinct difference in the topsoil mixture is found. Since the chances are good that the club has built the greens in the past 75 years, it is also very likely that the soil mixture on the greens has been modified. Using this method, the original green size and shape can be determined. It is not unusual to find putting surfaces that have been reduced 500 to 1,000 square feet over the years. The greens that seem to lose the most area are the ones that were large originally. After a determination has been made that the putting surfaces have been reduced, the next step is to regain the lost area. A photographic record of the before and after product would prove of great benefit in preventing a reoccurrence of the problem, because the pictures could serve as a constant reference.

Reclamation of old putting areas can be a delicate operation. The transition from a fringe cut that is generally 1/2 to 3/4 inch in height to a cut of 1/4 inch or less is a difficult one for grasses to make.

Considerations must be given to the amount of thatch that has accumulated in the turf, the weather conditions, what type of grass is presently growing in the fringe, and last but not least, how healthy is the turf.

Weather conditions play an important role in how well the grasses make the transition. Good growing weather is needed; cool nights and warm days are ideal. Generally, this type of weather can be experienced in mid-fall and early spring in the Northeast.

Thatch removal is essential for the grasses to make the transition from a high height of cut to a low one. The thatch prevents a strong, deep root development, prevents good water and air movement into the soil and is an excellent breeding ground for disease. Thatch removal ideally should be completed prior to the height of cut being lowered. However, in most cases it is not practical from the time standpoint, because normally it takes three to four aerations followed by severe vertical mowings to effectively remove excessive thatch. The goal should be to have the thatch layer on the fringe the same thickness as on the greens so both areas will respond the same to the maintenance program.

Overseeding and top-dressing are important in the reclamation process. A good, thick permanent grass stand is much easier to maintain.

Generally fall is the best time to initiate the lower cut on the fringe area. Lower the cut gradually, perhaps over several weeks time. This will give the grass a chance to recover prior to the winter weather and the entire spring to develop a strong root system that will support the grasses through the stress periods of the hot growing season.

The addition of four to five cupping areas will serve to reduce wear on other areas of the green. These new areas can serve to give overused cupping areas an additional four to five days to recover before the cup rotation on the green returns to a previously used location.

Every golf course superintendent has his own ideas of how far the cup should be moved from a previously used location. This largely depends on how much cupping area is available on any given green. Some may consider a 3-foot radius around the cup as a cupping area, others 4-, 5-, or even 6-foot radius. If these numbers are used, it means moving the cup at least six feet, and at the most 12 feet from the original location. When the 3-foot radius is used, the cupping area is 28.36 square feet; a 4-foot radius gives a cupping area of 50.24 square feet; a 5-foot radius covers 78.50 square feet; and a 6-foot radius covers 113.04 square feet. These figures show how quickly a putting surface can be used by rotation of the cup.

Many golf courses will receive at least 30,000 rounds of golf over a 6-month period. Just think how nice it would be to have 100 square feet of usable cupping area for every 1,000 rounds of golf played in a 6-month period of time. That would give the club roughly one cup placement a day for a month before the cup returned to the original location. Remembering the earlier figures, the average green is 5,000 square feet, with 3,296 to 3,608 square feet of recommended cupping area if the green is level. That would be slightly more than the 3,000 square feet these ideal figures have produced.

Old green with severe contours was built for a club with 200 members; now there are 350 and no additional cupping areas.

NEWS NOTES FOR JULY

From Monty Moncreif, Southern Region

For the past several years, we have been concentrating on control of *Poa annua* in bermudagrass fairways across the South, and have done an excellent job in eliminating it. Another weed, some times called Spurweed (genus *Soliva*) is now becoming more prevalent. It can be controlled with Bromonoxyl at four ounces ai per acre before the weed matures. Trexsan or Trimec will also give control.

From Al Radko, Eastern Region

The response of sand companies to Green Section Sand Specifications for bunker use as well as for soil mixes (greens construction and top-dressing mixtures) has been most gratifying. We have received an indication from several companies who are working to stockpile sand that conforms; i.e., a range from .25 mm to 1.0 mm for bunker use and from .11 mm to 1.00 mm for soil mixes with 75% ideally in the .25 mm to .50mm range. Hopefully, sand companies throughout the nation will make "golf course sand" available and as commonplace to buy as Mason, Brick or Concrete sands are now.

From Bill Bengeyfield, Western Director

Yosemite is the only National Park having a golf course within its boundaries. (It was already there when the Park Service acquired the additional land nearly 50 years ago.) It is called Wawona and is truly one of our country's most picturesque and delightful national treasures.

Last spring, in the snows at Wawona, new Superintendent Kirk Golden was taking inventory of the golf course maintenance equipment. It was meager indeed when compared to that which he had become used to at resort courses in Palm Springs. At about the same time, Kirk read "Those Were The Good Ould Days" in the May, 1975 issue of the *USGA Green Section Record.* This story told of the equipment inventory on a golf course in 1930. Until he found a power top-dressing machine and green aerifier at the rear of the Slaughter House, Kirk was sure someone had turned the clock back on him by 50 years!

Oh; the "Slaughter House"? That's the original name of the old building where the golf course equipment now spends the winter! Those were the good old days.

From Herb & Joe Graffis, Florida

(Editor's Note: In both the printed and spoken word, no one has recognized and supported the work of the golf course Superintendent and the USGA Green Section more than Herb and Joe Graffis.) In the April, 1975 issue of *Golfdom's* "Swinging Around Golf," Herb Graffis writes:

"Required reading for golf businessmen: The 81st annual report of the executive committee of the USGA must be considered required reading by anyone who claims to know—or should know—golf business.

"The USGA report is for persons who are officially certified, or think they should be, as golf pros, club managers and superintendents. It is the ABC's and a preview of the higher learning for those needed and ambitious young men who are getting educated for happy, prosperous and secure careers in golf. It is a basic schoolbook for those in the PGA, CMAA and the many agricultural schools with which the GCSAA is associated.

"The USGA is the best-directed and operated organization in American sports today—perhaps in

Kirk Golden and Bill Bengeyfield at Wawona in Yosemite National Park.

Herb and Joe Graffis

world sports. For national public service and usefulness to the amateurs and professionals and businessmen in the game, it governs with consent of the governed, and there is not a sports body anywhere nearly as good for the country and its sport as the USGA.

"The USGA's Green Section Service is the biggest bargain any sports organization—amateur or professional—gives its players and public. Yet income from the Green Section Turfgrass Service in 1974 was $261,065 while its expenses were $364,-113.

"The treasurer's figures can only tell a small part of the USGA story. Services contributed without charge by officials and committee members mean time, brains and results in the millions for the benefit of all golfers."

From Billy Buchanan, Eastern Region

Dateline 1931—The Golf Club Organizer's Handbook

"Some of the fertilization methods employed by small town clubs show considerable ingenuity and thrift. At the Glenbrook, Nev. course the greens were turning yellow because of the lack of fertilization. The club had exhausted its maintenance money, so it took manure about six months to a year old and put it in barrels about a quarter full. The barrels then were filled with water and stirred for two hours. The lighter part of the material was drained off and screened and the liquid was put on the greens with a sprinkling can. Soon the greens returned to their natural color. The method has been repeated twice monthly, with the only unfavorable aspect being the possibility of introducing too many weeds into the green."

This creative greenkeeper must not have heard about the article that was published some 17 years earlier explaining how to control the pesky weeds and control them economically.

"If weeds are to be controlled economically, it is most important that the proper implements should be used. Perhaps the most important weeding implement is a suitable cushion upon which the man can kneel or sit while he is at work. If he is made comfortable while working, he can do fully twice as much as if he is obliged either to kneel with his knees on the hard ground or crouch down in a cramped position. And if the ground is moist, the workman's knees should be protected from the wet. A section of hair mattress about two feet long, eighteen inches wide and four inches thick covered with a thick oil cloth, so as to be waterproof, should be provided for each weeder.

"The best implement which we have found for pulling up the weeds consists of a pair of tweezers about 6½ inches long, having a wooden handle fastened onto each leg. Each weeder should have a light tray or basket for receiving the weeds, which he holds in his left hand while the weeds are pulled up with the tweezers in his right.

"Strings should be stretched across the green about three or four feet apart, so that the weeder may be sure that he gets all of the weeds between one pair of strings before he starts work on the next.

"The most economical way to get the weeding done is for the greenkeeper to select a 3- or 4-foot wide strip representative of the infestation on the green and time a good workman while he weeds it thoroughly. This will enable him to figure how long the weeding of the entire green should take. By offering the workman 35 per cent increase in his pay, providing the man does his work thoroughly and finishes his weeding within the required time, the weeding will be done for half the usual cost, in spite of the fact that the man while at it earns much higher wages. It is our experience, however, that laborers will not work at their proper speed and do thorough work for less than a 35 per cent increase in wages." According to the method described, "one good workman can readily water, mow and thoroughly weed three greens (averaging 7,500 square feet each), from the time they are ready to play on, and keep them in perfect order during the growing season."

Those were the good old days(?)

The Turfgrass Service of the USGA Green Section

The Turfgrass Service of the USGA Green Section again enjoyed an increase in total subscribers last year and looks forward to even greater membership support in 1975. It is the only non-profit advisory agency devoted solely to golf course turf, its playing conditions and its management. It has nothing to sell. The eight Green Section agronomists cover the nation and have made nearly 30,000 direct golf course visits to subscribing clubs in the past 23 years! Every USGA Member Club should subscribe to the Service. The cost is less than 1/3 of 1 per cent of most golf course maintenance budgets today. Why not put this highly trained team to work for your club this year?

Turfgrass subscribers receive the following benefits yearly:

1) Several direct conferences with a Green Section agronomist, in this manner:
   A) A scheduled half-day, on-the-course consultation, followed by a written report from the agronomist to the Course Superintendent and Green Committee Chairman or club representative. Second visits are available if needed at no additional charge and at the club's request.
   B) Consultation with the agronomist at local group meetings and turf conferences.
2) Assistance by correspondence and telephone.
3) A subscription to the USGA GREEN SECTION RECORD, dealing with golf turf affairs, six times a year, addressed to the Golf Course Superintendent. (This is in addition to the subscription sent to the Green Committee Chairman in connection with USGA Membership.)
4) A voice in the direction of turf research whose results benefit golf courses. The subscription fee covers all services and expenses; there are no extra charges for travel. (The fee for the Green Section Turfgrass Service is additional to dues for USGA Membership). A list of regional Green Section offices can be found inside the front cover.

APPLICATION FOR TURFGRASS SERVICE OF USGA GREEN SECTION
(Open to USGA Members Only)

Date_____, 19___

Full Name of Club or Course_____

Permanent Mail Address (street or box)_____

Post office _____ State _____ Zip _____

Application authorized by: _____ Title _____

Course Superintendent _____

We hereby apply for the Turfgrass Service of the United States Golf Association Green Section and certify that we are eligible for the class checked below.

We enclose the fee (see schedule below) for the current year ending December 31. The USGA GREEN SECTION RECORD is to be addressed to our Golf Course Superintendent (this is in addition to the subscription sent to our Green Committee Chairman in connection with USGA Membership).

This application is automatically continuous from year to year unless interrupted by advance resignation.

Check Proper Class:

_____ Less than 18 holes $280
_____ 18 to 27 holes $360

More than 27 holes:

_____ 36 holes $385
_____ Per regulation course in addition to 36 holes . . . . . $ 75

Please send receipted invoice

If a subscribing member feels it requires a second visit, or if the appropriate USGA agronomist feels a second visit is required, it will entail no additional charge. For each visit after the second, the fee will be $200.

USGA GREEN SECTION RECORD
JULY 1975

TURF TWISTERS

"IPSO FACTO" = By The Fact Itself

Question: What can I do through cultural practices to encourage turfgrass growth in the shaded areas around the clubhouse? (Wisconsin)

Answer: Pruning the lower branches and thinning out some of the upper limbs of surrounding trees allows the needed light for photosynthesis to reach the turfgrass plant. Raising the cutting height, deep, infrequent irrigation and controlling the traffic will also help, not to mention adequate fertilization, liming, and perhaps an occasional overseeding when needed.

"FERAE NATURAE" = Of A Wild Nature

Question: I haven't had real success with my insecticide applications on greens lately; what could be the problem? (Illinois)

Answer: Perhaps your water pH has something to do with your problem. Insecticides in general are affected when water is alkaline more than fungicides or herbicides. Organophosphates and carbamates are decomposed more rapidly than chlorinated hydrocarbons. Hydrolysis is rapid at a pH slightly above 7.0 when using Malathion. Why not check your water pH and the product you are using to see the rate in which this material will hydrolyze.

"INTER POCULA" = Between Drinks

Question: Are some sands "softer" than others? In my experience, sands of what seem to me to be similar particle size play differently. Am I correct and if so, what causes this? Is this "ipso facto" or am I "ferae nuturae" concerning my thoughts and if so, please forgive this explosion. (Pennsylvania)

Answer: You are "ferae naturae" and "ipso facto" but "inter pocula." Let's discuss the specifics.

Sands of round particle size are softer, and the ball will have more of a tendency to bury, a "fried-egg" will result more often. *Sharp* sand is more desirable in bunkers! Sharp, angular particles set up slightly more stable, slightly more compact. Round-shaped sand is more desirable for use in putting green soils. The major portion of all sands for bunkers or putting green soils should range from 1mm to .25mm in size preferably. Please see our September, 1974 issue of *USGA Green Section Record* for specifics.