

MARCH 1977

USGA GREEN SECTION RECORD

A Publication on Turf Management
by the United States Golf Association





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Edward F. Casey, left, receives the Green Section Award from Green Section Committee Chairman, Will F. Nicholson, Jr., center, and Harry W. Easterly, Jr., USGA President, right.

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Great Golf Courses Of America

and What Makes Them That Way

Edward F. Casey, 17th Recipient of USGA Green Section Award

Edward F. Casey, of Union, N.J., became the 17th recipient of the USGA Green Section Award for distinguished service to golf through work with turfgrass. The Award is made annually and was presented to Mr. Casey by Harry W. Easterly, Jr., of Richmond, Va., President of the USGA, and Will F. Nicholson, Jr., of Denver, Colo., Chairman of the USGA Green Section Committee. The ceremony took place during the 21st Annual Green Section Conference on Golf Course Management which was held in Atlanta, Ga., on January 28.

Mr. Casey served for 22 years as golf course superintendent at the Baltusrol Golf Club, Springfield, N.J. He was responsible for preparing the club's Lower Course for four USGA competitions during that time, including the U.S. Open Championships of 1954 and 1967, the 1946 U.S. Amateur and the 1961 Women's Open.

Mr. Casey did a considerable amount of work with Merion bluegrass during its early development, as well as in weed and insect control. He has authored many articles on golf course maintenance and management and has been a featured speaker at meetings of the Golf Course Superintendents Association of America and at USGA Conferences. He trained a number of men who have distinguished themselves in the profession of golf course superintendent, including his own successor at Baltusrol, Joseph R. Flaherty.

Mr. Casey came to the United States from England. He began his career in turfgrass work in this country at the Somerset Hills Country Club in Bernardsville, N.J., in 1921. He later worked at the Rye Country Club, Rye, N.Y., and Wykagyl Country Club, New Rochelle, N.Y., before coming to Baltusrol in 1945.

He is the fifth golf course superintendent to be presented the Green Section Award. The others are Joseph Valentine, Merion Golf Club, Ardmore, Pa.; Elmer Michael, Oak Hill Country Club, Rochester, N.Y.; James L. Haines, Denver Country Club, Denver, Colo., and E. R. Steiniger, Pine Valley Golf Club, Clementon, N.J.

Casey accepted the Award before an audience of over 500 with the following remarks:

"Thank you for the opportunity to express my

pleasure and appreciation as recipient of the Green Section Award in 1977. My pleasure is further extended by the invitation to join the group of distinguished gentlemen—my predecessors—in this Award.

"I would like to extend a few remarks that may be of interest to the younger men of the Golf Course Superintendents Association of America.

"I believe, with assurance, I can say the competence of the superintendent is apparent in the preparation and maintenance of turfgrass in its total environment and the management of the golf course, including overall landscape.

"That may appear to be a bland statement, yet perceive what is behind it. There is a fabric of components of which the superintendent must have superior knowledge. Any one of them, or in some combination with each other, can cause a problem. By judicious inquiry, the young superintendent can build a level of knowledge from disseminated practical and technical information now in place. With an intimate knowledge of all related subject matter, he can promote competency and strength along with confidence in accepting accountability for one's actions.

"I believe it was in the mid-20s when the United States Golf Association and the U.S. Department of Agriculture applied expertise to the problems of turfgrass management for golf. They were ably supported by the young Golf Course Superintendents Association of America and later by the universities and golf course architects. The input over the years, particularly by the individual contributions of earlier recipients of the Green Section Award, has given us today's great golf courses.

"I find myself the beneficiary of an experience wherein I dwell in comfort and reflect on the improvements we now enjoy. Had I, at any time, served to motivate some part of that improvement, I am well satisfied and well rewarded."

For more on Mr. Edward Casey and the role of the course superintendent in golf, please read "The Invisible Men," by Furman Bisher of the *Atlanta Journal* on page 28 of this issue.

What Makes A Golf Course Great

by **GEORGE H. BRODNAX III**, President, Atlanta Athletic Club, Duluth, Ga.

It is a real pleasure for me to be here today as I have looked forward to this meeting for some time. It seems strange that I, a layman golfer, should be here on your program with such qualified experts, addressing such a knowledgeable group of golf course superintendents and professionals. My viewpoint on the subject of what makes a golf course great, therefore, is from the viewpoint of a club member, a club director and officer, and an average golf player. Sometimes ideas and thoughts coming from ignorance or innocence can generate meaningful results.

What makes a golf course great? First we should look at the game. Golf is a very unusual game compared to just about any other game we can think of. Football, basketball, baseball, track, swimming, tennis, all use facilities for competition that are basically the same. All football fields are exactly the same size. The same thing is largely true with basketball, tennis, and all the others, while golf is played on courses that are individualistic and different. No two golf courses are alike, and this in itself offers opportunities that contribute greatly toward making golf the extremely popular game that it is.

How many tennis courts have you seen with beautiful lakes coming into play? How many baseball diamonds have you seen with rivers flowing by the outfield? How many handball courts have you seen with large old oak trees gracing their boundaries? I ask these questions to emphasize the tremendous opportunities we have to make golf a lasting and pleasurable experience. Even hunting and fishing, popular leisure activities, while offering beautiful natural outdoor environments, do not offer the creativity or personal development that golf courses invite.

That brings us to our topic. What is it that makes some courses better than others? What are the characteristics of excellence that make one course stand above others? There certainly has to be a combination of things involved to justify greatness; no single factor, in my opinion, can make it so.

THE MEMBERS

First, and the most important single factor, is the enthusiasm and pride of the club membership. These are the people who determine by their interest and their money exactly how their golf course is to be built initially and how it is to be maintained throughout the years. They influence the geographic location of the club, the selection of the architect, the builder, the landscaper, the golf course superinten-

dent and the golf professional. If they are proud of their course, they will continue to finance the necessary improvements and proper maintenance required to keep it a great course to play. Their enthusiasm is extremely important in assisting management to stay on its toes to provide the very best.

Naturally, I'm prejudiced, but I believe our two Atlanta Athletic Club courses qualify as great golf courses and the enthusiasm expressed by our membership during the 1976 U.S. Open Championship in working some 1,200 members to make this one of the finest tournaments ever held, proves what can be accomplished if the membership has the right attitude and desire.

Bobby McGee, our superintendent, and his staff expressed the same enthusiasm and pride and the results speak for themselves. Several years ago I would have labeled our two courses as only "good" and not in the category of "great." I will explain why a little later, but the point here is that our membership was willing to spend several hundred thousand dollars to put them in the "great" classification. My point is that without the proper membership attitude, you will never have a great golf course, and I, therefore, label this as the most important single ingredient.

ARCHITECTURE

Architectural features of a golf course are part of a uniqueness. In laying out a course, consideration should definitely be given to **who** will be playing. Care should be observed so that the course is not built only for the better golfers—the professionals or scratch player—nor should it be built only for the duffer or beginners. A great golf course is one that can be enjoyed by all players—both men and women.

The placement of the tees is a controlling factor here that is very often overlooked in planning a course that all will find enjoyable. Obviously, the course must truly challenge the good player, yet be so designed that the others with shorter and less accurate games will feel that they have an opportunity to compete. Tee length and placement are the primary considerations in designing a course for all of the players, and the great course must be one for *all* players.

Selection of the site for a course must be made with care to be certain architectural features can be incorporated to meet the wishes of its members. With the availability of large earth moving equipment today, courses can be altered to achieve certain de-



Enthusiasm and pride of membership are the ingredients that made the 1975 U.S. Open Championship at Atlanta Athletic Club such a success.

signs to make each hole unique. Lakes can be created to make the hole more difficult, to add beauty, or to aid in the drainage. The dirt removed can be used to elevate the green or tee. A good example of this would be the seventh hole on our Highlands Course. An average par 3 hole was made into a very tough and challenging hole and at the same time gave us some relief on a serious drainage problem.

TERRAIN

Of course, different areas of the country have different types of terrain, yet you will find great golf courses whether the land is flat or hilly, where the architect has moved earth around with ingenuity and vision. He has literally created the type of terrain he feels will make a hole meet the challenge of its players, and at the same time give the hole character and beauty. Proper and skillful use of the earth moving equipment available today will play a large part in helping to make a golf course that might be just an ordinary one into one that is great.

Fairway treatment is another good example. Far too many courses have flat, unattractive fairways that give the impression that too many of the holes are alike. Moving dirt around can create swells and slopes that add beauty, and at the same time, challenge the player on his fairway shot. Fairway bunkers placed in the landing area of the tee shot can penalize the errant shot maker and add greatly to the difficulty of the hole.

Variety is certainly the spice of life when it comes to golf courses. Treatment of greens and bunkers during the design and construction stages truly contribute to the degree of greatness of a course. The use of small greens on shorter par 4s and par 3s add to the difficulty and test the golfer's accuracy, while

the longer par 4s and par 5s with larger greens can be sloped and slanted to achieve a different element of skill.

Our 10th hole on Highlands was changed completely three years ago. We had to move the tee, and this cut the length of the hole by 50 yards, making a shorter par 4. To proportion it, the green was reduced by two-thirds, creating a smaller and more difficult target. Yes, fascinating and innovative things have happened in the field of golf course construction in the last decade, and because of this factor, we are seeing more great golf courses. We are seeing more holes that require thinking and finesse.

SCENERY

I mentioned earlier that it took a combination of things to make one course stand out against others. This is a personal opinion of one who loves the game, but I believe strongly that spectacular scenery contributes to a great degree in making great golf courses. This doesn't mean that the course has to be on the ocean, such as Cypress Point and Pebble Beach—even though I'm sure you would all agree that they have spectacular scenery, and it certainly contributes to the greatness of both courses.

All over this country we are blessed with outstanding beauty, and courses can and should be located where they can be appreciated by the players. Oceans, rivers, lakes, mountains, trees are all contributors to this scenery. The large, old and beautiful hardwood trees at Oakmont and Winged Foot are examples of how trees can be used to advantage. While we recognize that this scenery does not come into play on the course itself, it certainly adds a lot to the pleasure of the game.

PLANTINGS

In addition to the spectacular scenery provided by nature, the club can enhance the beauty of its course by selective planting of shrubs, flowers and trees. Many of the great golf courses have taken advantage of evergreens and seasonable flowers to decorate locations out of the playing area in order to add to the scenery and pleasure of the golfers.

In the Southeast, dogwoods, azaleas, honeysuckle, and crepe myrtle all make outstanding plantings, along with many varieties of flowering plants. The Augusta National Club in Augusta, Ga., is an example of how planting programs can contribute to the development of a course. This outstanding course in the spring is indeed a sight to behold with all of its decorative plants in full bloom.

I have dealt here, thus far, with the decorative aspect of planting shrubs and trees in places around the course well out of the playing area but within sight for the golfers to enjoy; and also to be used as screens to shield any undesirable views and noises from the players. In addition, trees can be selectively planted to alter or improve a particular hole. Fairways can be narrowed by the proper use of trees, or a tree can be planted to force players away from a short cut or to make a hole play with more skill by requiring a more accurate drive. A cluster of trees planted behind a green can create a silhouette to enhance the beauty as well as give the player a more challenging hole.

CARE & MAINTENANCE

A golf course can be located on the most beautiful piece of land, with fantastic natural scenery all around it, designed and built by the very best architect with the most challenging holes and be classified as a great golf course in every respect, but without proper maintenance and care, it will surely not remain great.

The way a course is maintained is extremely important for the maturity of the course, and until a course matures it cannot really be in the category of the "great" ones. The golf course superintendent must be knowledgeable about local grasses, shrubs, trees and the fertilizers and food for his particular area. Each section of the country requires an

altogether different concept on types and care of grasses.

The programs conducted by the United States Golf Association Green Section are invaluable to the member clubs. I know the value Jim Moncrief has been to our area with the continuous testing and experimenting conducted and information passed along to the clubs for incorporating into their programs of proper planting and fertilization.

There are certain times during the year that the superintendent must thatch, replant, fertilize, and do other necessary things to insure continued success in the development of the course, and for short periods of time, the playing conditions will not be ideal. If the superintendent will communicate information in advance to the membership as to when these things will take place, he will be able to maintain the enthusiasm and support of the members.

A logical method of accomplishing this is through the golf committee with timely articles in the club's monthly newspaper and also through the golf professional. Proper communications by the course superintendent to the members will insure their cooperation and he will be able to perform the maintenance necessary for the course to play at its finest. The way a course is maintained is a definite prerequisite for greatness.

WHAT IS "GREATNESS?"

My interpretation of what makes a golf course great might differ from yours or the importance of certain elements might vary, however, I feel very deeply that all of the ingredients I have mentioned today are vital and necessary for a golf course to be considered for greatness. I realize that I have only scratched the surface and each aspect I have touched on but briefly, could be the subject of an all day session. Fortunately, there are no standard sets of plans for construction of golf courses, but rather the opportunity exists for each one to create something new, something different, something outstanding, to attract even more people to this fascinating game. The interest has never been higher than it is today, and I am confident that with your dedication and enthusiasm we will see more and more great golf courses.

No two golf holes are alike anywhere in the world. Linville Golf Club, N.C.



Better Turf Means Better Golf

The Bermudagrasses

—Past, Present, and Future¹

by DR. GLENN W. BURTON²

Bermudagrass is one of the world's most versatile turfgrasses. When properly managed it is able to withstand daily defoliation to a height of 1/4 inch on the golf green, tolerate severe punishment on the football field, or make a beautiful lawn.

Bermudagrass is a highly variable species that reproduces sexually. Members of the bermudagrass genus *Cynodon* range in size from plants with pencil-sized stems that may reach a height of five feet to tiny fine-stemmed types that grow less than five inches tall. Common bermudagrass, *C. dactylon* (2n = 36), and African bermudagrass, *C. transvaalensis* (2n = 18), are the two species best suited for turf. Although generally considered a subtropical species, a clone collected in Berlin has survived in north Central Michigan and Canada. The tough, rapidly spreading stolons and rhizomes of bermudagrass make vegetative propagation practicable. All improved varieties are planted in this way. The bermudagrass seed produced in the United States is the common type and is produced largely in Arizona.

Past

The first bermudagrass golf greens were planted with seed of common bermudagrass. These greens demonstrated the pros and cons of common bermudagrass for golf greens. Disease, insects, and nematodes soon thinned stands so crabgrass and other weeds could invade the turf. Bermudagrass greens were overseeded with ryegrass in the fall to give a green putting surface in the winter. But when the ryegrass died in the spring, most greens were not green until the common bermuda could cover the bare spots left by the dead ryegrass. This was called the 'transition,' a period everyone accepted as another undesirable feature of bermudagrass for golf greens.

Golfers complained that bermudagrass greens were inferior to bentgrass greens in putting quality. But attempts to grow bentgrass on golf greens in the deep South failed and golfers reluctantly accepted bermudagrass greens. They had no other choice.

Some admitted that bermuda greens offered excellent alibis for shots that missed the cup.

A few golf course superintendents (called greenkeepers in those days) observed small patches of better turf on some of their old greens. Several of these men, including Lester Hall, in Savannah, Ga., took up the turf from the best of these spots, increased it vegetatively, and used the increase to plant one or more greens.

U-3, from Lester Hall's golf course, was one of these that passed the tests in the USGA grass plots at Arlington, Va. It was propagated vegetatively on a number of golf courses and some football fields until it was replaced with the superior hybrid bermudagrasses. "No-mow," collected on the Mobile Country Club in the early 1960s, is another vegetatively propagated natural variant in common bermudagrass that proved superior to the turf generally obtained from seed.

Breeding bermudagrass for better turf began at Tifton, Ga., in 1942 when we crossed a very dense

Tifgreen stolons ready for planting.



¹ Cooperative investigations of the Agricultural Research Service, U.S. Department of Agriculture, and the University of Georgia, College of Agriculture Experiment Stations, Coastal Plain Station, Tifton, Ga.

² Research Geneticist, ARS, USDA, and the University of Georgia, College of Agriculture Experiment Stations, Coastal Plain Station, Tifton, Ga.



The bermudagrass breeding work of Dr. Burton, supported by the Green Section, has reached across the world. Here, Kapalua, Hawaii and tifdwarf.

drawf (from our pasture breeding research) with highly disease-resistant selections of common bermudagrass. The superiority of one of these hybrids (Tifton 57) was proven in 3 years of comparison with the best selections from a number of Southern golf courses in plots planted at Tifton in 1946. Characteristics sought in these grasses were dependability, good green color throughout the growing season, frost resistance, drought tolerance, weed resistance, disease resistance, and compatibility with overseeded wintergrasses. Tifton 57, officially released as "Tiflawn" in 1952, continues to be the best variety for football fields, playgrounds, and other areas that receive rough treatment. It was too coarse and made too much growth for golf greens.

The next product of our turf breeding program was "Tiffine" (Tifton 127), a cross between Tiflawn and *C. transvaalensis*. This sterile triploid had a softer, finer texture and was better suited for golf greens than Tiflawn. It was soon replaced, however, by Tifgreen (Tifton 328), an F_1 triploid hybrid between *C. transvaalensis* and a superior *C. dactylon* from a golf green at the Charlotte Country Club in North Carolina.

Tifgreen, officially released in 1956, made a better putting surface than other varieties and has been extensively planted on golf greens. It has also been used to a lesser degree on fairways, tees, and lawns.

Our fourth improved turf variety (released in 1960) was Tifway, (Tift 419), a dark-green sterile triploid (*C. transvaalensis* x *C. dactylon*) hybrid with greater frost tolerance than Tifgreen. Its stiffer leaves and greater pest resistance than Tifgreen made it particularly well suited for golf fairways and tees, lawns, and athletic fields with moderate wear.

In 1965, we released Tifdwarf, a vegetative mutant of Tifgreen. Tifdwarf has finer stems, shorter internodes, and smaller, softer, darker green leaves than Tifgreen. It makes a denser turf than Tifgreen and, when mowed at 3/16 inch and properly man-

aged, makes a putting surface comparable with the best bentgrasses. Although planted on lawns, it is best suited for golf greens.

Most of the other named varieties of turf bermudagrasses, such as "Everglades," "Ormond," "Bayshore," "Pee Dee," "Santa Ana," and "Sunturf" are *C. dactylon* x *C. transvaalensis* F_1 hybrids that occurred naturally, frequently on golf courses when *C. transvaalensis* was being tested on golf greens. Their superiority in part of a golf green led to their isolation, increase, naming, and release.

Present

All interspecific *C. dactylon* x *C. transvaalensis* hybrids are sterile and shed no pollen. This makes them attractive lawn grasses for people who are allergic to bermudagrass pollen. Such sterility facilitates their control, yet it imposes no serious handicap on their use, because they can be easily propagated by planting sprigs. The sterility of these hybrids does, however, prevent their improvement by the common plant-breeding methods of hybridization and selection.

Attempts in recent years to improve the "Tif"-bermudagrasses by making new interspecific hybrids have failed. The best of these (nearly as good as the "Tifs") are being kept in our nursery as insurance against a possible disaster such as the 1970 corn-blight disease. It now appears that radiation breeding will be the most practical way of improving these highly successful varieties.

The success of the natural mutant Tifdwarf suggested to us several years ago that increasing the natural mutation rate with the aid of mutagenic agents could create other useful varieties. Such mutants should retain most of the superior traits of the "Tif"-bermudagrasses while differing in such traits as plant color, size, and pest resistance. Theoretically, treatment of highly heterozygous plants, such as our "Tif"-bermudagrasses, with mutagens

should create mutations that can be seen in the immediate M-1 generation.

Thus in the winter of 1969-70, with the help of Dr. Jerrel Powell, we began research designed to create mutants in our best triploids, Tifgreen, Tifway, and Tifdwarf. Dormant sprigs (stolons and rhizomes) washed free of soil and cut into one and two node sections were treated with the chemical mutagen EMS and gamma rays from a Cobalt 60 source.

The EMS treatments failed but the proper concentration of gamma rays (7,000 to 9,000 r) produced 158 mutants. These were increased and planted in plots at Tifton, Ga., and Beltsville, Md., where they have been evaluated for several years. Several of the mutants (smaller and slower-growing than Tifdwarf) seem to have no economic use except perhaps in some miniature garden. Other mutants that seemed better than their parents, Tifgreen, Tifway, and Tifdwarf, early in the test period now are recognized as no better if as good. New varieties must be better than those now available, and satisfying this requirement is not easy.

Future

We still have nine mutants that appear to be bet-

ter than their parents in one or more characteristics. Two of these seem to be immune to rootknot nematode. Two seem to be able to tolerate attacks from several nematode species without loss of vigor. One mutant rarely produces seed heads. These nine mutants and their three parents are being increased in the greenhouse this winter. With the help of Dr. A.W. Johnson and Dr. Homer Wells, ARS, USDA, nematologist and plant pathologist, we plan to evaluate these 12 grasses in large replicated plots. We also plan to conduct at least one more greenhouse test to assess their resistance to several different nematodes. The field plots will be subjected to several different kinds of management, with and without the benefit of nematicide treatment.

Will at least one of the nine mutants be better than Tifgreen, Tifway, and Tifdwarf? If we could answer that question, we wouldn't conduct the tests described above. We know they must be better if they are to improve the game of golf. That has been our goal for more than 30 years and will continue to be.

Great Golf Courses of America

—Factors of Play

by JAMES R. GABRIELSEN

Peachtree Golf Club, Ga.
United States Walker Cup Team—1971

Great golf courses of America is a fascinating subject because of the large number of wonderful golf courses in this country. Which are considered great and why? The longer I thought about that question, the more I came to realize that there is no simple answer.

One of our popular golf magazines conducts a survey among players every other year to pick America's top 100 golf courses. When you look at the first 10 or 20 courses on that list, it's amazing to see the variety in course design, length, and other factors, such as size of greens and number of bunkers. What common blend of characteristics makes those courses stand out above others. Courses like Pebble Beach and Augusta National, Pinehurst and Merion certainly have contrasting styles of architecture and use of terrain, but they are considered by most to be among the best courses in the world.

I want to discuss the factors of play and how they relate to a so-called great golf course. Let me begin by saying that factors of play such as turf, greens, tees and hole locations do not necessarily have to be ideal in order to have what is referred to as a great golf course. Naturally, the tournament player

would want to have conditions to his liking, and very often does, but a great golf course will maintain integrity even when the conditions are not ideal from a player's point of view. However, if you were to ask a group of tournament golfers, be they professional or amateur, what type of playing surface they prefer, you would probably get a rather consistent answer:

1. Fast and true greens.
2. Greens that will hold well.
3. Tees that are level and firm.
4. Fairways closely cut.
5. Hole locations that are challenging but fair.

Now, let's examine these factors a little closer.

Good greens, from a player's point of view, are essential for a great golf course. A fast putting surface is preferable because the player can usually putt most effectively when he can slowly stroke the putt with little physical exertion as opposed to hitting the putt with the blow required of a slower green. Short putts are generally easier on a faster surface because of the light, easy stroke required. The trueness of a green is a characteristic which varies with types of grasses and physical terrain. Lessening the effect of grain adds to the true roll of the ball.

Greens that will hold a shot of varying length is

certainly a factor preferred by the tournament player. For example, several years ago Augusta National Golf Club was criticized by players in the Masters when winds had dried the greens to such a point that very few shots would hold on certain greens, such as 10, 12, and 15. Now, I would be the first to say, "Why shouldn't the players be required to land the ball short sometime and run the ball into the green as is often required in Scotland?" but I haven't seen many balls bounce up the hill in front of No. 10 or bounce over the water hazard in front of 12 and 15. Situations such as these obviously demonstrate that most of the great golf courses of America were not designed so that the ball could be run into the green. Instead, the ball must fly onto the surface after carrying over a greenside bunker or water hazard. The greens, in general, therefore, should hold a well-struck shot.

Now, let's examine tees. This is one portion of a golf course which is often overlooked but, I feel, is extremely important. Closely cut, level tees are characteristic of great American courses. The level aspect is essential for good footing and balance, the close mower cut for a clean strike of the ball. Notice, sometime, how the tees of a great golf course will stand out with these characteristics.

Fairways of the great American courses are made up of a variety of grasses, textures and terrain. Generally, however, they are closely cut to allow the

*Perfect fescue fairways of yesteryear—
National Golf Links of America, Southampton, N.Y.*



player to meet the ball with the clubface, striking a clean blow—no grass between club and ball. The so-called "flyer" has probably ruined more positive thinking golfers than any other shot. Surprisingly, some players have a tendency to hit flyers more often than others.

As to type of fairway grass, it makes little difference, provided the turf is relatively firm and the grass cut low. I prefer a good bermudagrass fairway and bentgrass greens. The bermuda seems to enable the player to spin the ball better, and the bent greens tend to have less grain.

Firmness of turf, along with a close mower cut, allows the tournament player to control the ball; and when the player of today's caliber can control the ball on any golf course, he will be putting for a lot of birdies. Softer turf will cut down distance and create control problems when soil sticks to the ball. The word "control" is the key!

Hole locations have often been a point of controversy in major tournaments. From a player's point of view, he expects to see difficult pin placements, but his interpretation of difficult and unfair may differ from those of tournament officials. Basically speaking, I believe that holes should be placed where the shot requires skill as well as judgement but can be stopped close to the cup. In other words, reward well executed shots.

An additional factor of play which is not controllable is the weather. The recent Bing Crosby Tournament at Pebble Beach was played under ideal weather conditions. The winning score was a record. Pebble Beach is a great golf course, but the wind is one of the factors which make it great. When the wind is up, Pebble is one of the great scoring challenges in the United States.

Obviously a player cannot always have the physical characteristics of a golf course to his liking. In most cases, he will have to adjust his playing style to the course conditions. Those who make the best adjustment are more often than not the winners of championships. Club selection and strategy will change with course conditions. Being able to cope with changing conditions, even during a round, often separates the great player from the nearly great.

In discussing the characteristics of good courses, Bob Jones once said:

"The ideal golf course would have to be played with thought as well as mechanical skill. Otherwise, it could not hold a player's interest. The perfect design should place a premium upon sound judgement as well as accurate striking by rewarding the correct placing of each shot. Mere length is its own reward, but length without control ought to be punished."

Control of the ball is what all good golfers are striving for. The great courses in America allow the player to make use of his talent to the degree that he can, yet challenge that talent to reward only the exceptional.

Great Golf Courses of America



Hells Half Acre, Pine Valley, N.J.

Great Golf Courses and the Rules of Golf

by **JOSEPH C. DEY, JR.,**

Former Captain, Royal and Ancient Golf Club, St. Andrews, Scotland.
Former USGA Executive Director, Former Commissioner, TPD of PGA of America

Last year the Royal and Ancient Golf Club of St. Andrews elected Roberto DeVicenzo an Honorary Member, a tribute paid to a very few "distinguished professional golfers." When Roberto appeared at the British Open Championship in July, he proudly wore his R&A club tie. The R&A is regarded by much of the golf world as the authority in Rules of Golf matters, so Roberto said with a twinkle and a flip of his tie, "Now I make my own rules—so tomorrow I shoot 64."

There was more truth than jest in that. If players could devise their own rules as they go along, the leading money-winner might be the cleverest rogue.

But tournament golfers and championship committees want fair rules that are enforced strictly and uniformly. The ideal course in terms of Rules of Golf

purity probably would have nothing on the back of the score card except "USGA Rules Govern Play." The players would go at it with just the basic Rules prevailing.

There is a scorecard almost like that at a course which many players think suitable for Utopia. It's Pine Valley, in New Jersey, near Philadelphia. By a quirk of fate, I have a Pine Valley scorecard here in my hand. All it says about Rules is this: "USGA Rules prevail—all sand playable as a hazard."

But the condition of the course is even more important than written regulations in play by the Rules. For example, are chronically damaged areas given the cover-up of treatment as ground under repair? Ground under repair leads to ball-lifting and change of the ball's position. That is contrary to the basic

principle of playing the ball as it lies.

Conversely, a well-kept course is a credit to the club, the superintendent and even the integrity of golf, no matter whether it is a championship test or a simple public course. In a word, the well-kept course contributes to the spirit of the game.

Objectives

Now in setting up a course for a Championship, there are three simple objectives in terms of the Rules of Golf:

1. Since a championship is a test of skill which should produce a worthy winner, the Rules should not soften that purpose and give undeserved breaks to inferior players.

2. The set-up should be fair.

3. The Rules conditions should be clear so that everybody is playing the same game. Questions of fact should be questions of fact, not questions of interpretation.

Applying the Rules

Let's see how the Rules book bears upon course preparation. Although most Rules are for players, many pertain to the course, so those in charge have an obligation to know where the Rules fit in with their work. First, let's consider the teeing ground and then the hole.

The teeing ground, in Definition 33, is a rectangle—but some superintendents don't seem to realize that it is two club-lengths deep. I've seen markers so placed that if you went back two club-lengths you'd be in the rough.

Even on proper teeing grounds, you sometimes can't take a swing from every part of the rectangle because bushes and tree limbs interfere. In a professional tournament many years ago, Jim Ferrier was penalized two strokes for breaking off a part of a tree branch that interfered with his backswing on

the tee. So tee markers are to be located so as to be fair to players, entirely aside from the tactical test.

As for the hole, Definition 15 says it is $4\frac{1}{4}$ inches in diameter and at least 4 inches deep. If a lining is used (and when isn't a lining used?), it must be sunk at least 1 inch below the green surface (unless the nature of the soil makes it impractical to do so). If the lining is just a half-inch from the surface, the hole isn't legal, and the round isn't legal, and it may have to be replayed. We've all seen balls hit a shallow lining and bounce out of the hole. Cutting holes should be done by a responsible man who knows the definition of the hole.

Before long he may also have to be an arithmetician. When we fully convert to the metric system, the hole will become 108 millimeters in diameter, at least 100 millimeters deep, and any liner must be sunk at least 25 millimeters below the putting surface. The American size ball, not less than 1.68 inches in diameter, becomes 42.7 millimeters. There'll be confusion when a golfer is first confronted with the notion that he must get a ball 42.7 millimeters in diameter into a hole only $4\frac{1}{4}$ inches in diameter.

When a Championship Committee selects hole locations, the course superintendent can give very helpful advice that may save the day if there is heavy rain. What are the drainage problems? You don't want to risk having a hole under water—that may make the course unplayable and cause suspension or cancellation of a round. So the men who pick the hole locations must always have the Rules of Golf in mind.

For the flagstick, no size is prescribed in the Rules, but the USGA recommends that it be at least 7 feet high; the PGA Tour *requires* 8 feet, so players have a standard target, hole after hole, week after

The third tee, the Lake Course, Olympic Club, San Francisco, considered one of the great par 3s in America.





The Himalaya Hole, The Country Club, Brookline, Mass.

week. The USGA recommends a diameter not greater than three-quarters of an inch, from a point three inches above the ground to the bottom of the hole. Such a diameter theoretically allows room for holing a ball on any side of the flagstick. The play of the game could be affected by what flagstick is used. Flagsticks should stand upright but not stick when being removed. Who hasn't seen a flagstick pull up a hole liner?

Out of Bounds

In setting up a course, it is useful to refer to basic definitions in the Rules book. Definition 11 says that "The 'course' is the whole area within which play is permitted. It is the duty of the Committee to define its boundaries accurately." Definition 21 says that "'Out of bounds' is ground on which play is prohibited."

Most courses are not as fortunate as Pine Valley in having no out of bounds, so you must decide where play is to be allowed. Where club property limits are concerned, that's usually easy. Artificial boundaries inside playing areas are generally inadvisable. They usually reflect a weakness in course design which ought not be corrected by twisting the Rules of Golf. However, it is often wise to put out of bounds automobile parking areas, the clubhouse, equipment buildings, tennis courts, swimming pools and the like. If those things are near playing areas, they sometimes are treated as obstructions, from which a free drop is allowed. The point is: The course must be inspected carefully and a policy decision made before marking the boundary.

The player must be able to know readily whether his ball is in or out of bounds—the difference is a penalty of stroke and distance—so boundaries must be defined precisely. Existing walls and fence posts usually do the job well. If anything else is needed, stakes and lines of paint on the ground are used. Stakes are good because they can be seen from a

distance; they should be sturdy, at least three feet exposed, painted white. Because stakes are often pulled up, the PGA Tour sprays white paint on the ground at the base of each stake, so the location of a missing stake may be readily known.

When out of bounds is fixed by stakes or a fence, the out of bounds line is determined by the nearest inside points of the stakes or fence posts at ground level, because golf balls usually rest on the ground. So the place where the stake or post contacts the ground must be clear and obvious. That's why fence posts—not just fences in the air—form the line. Trees are bad boundary markers because their trunks and roots usually are irregular where they meet the ground.

Easy sighting from one stake or post to the next is necessary. Underbrush and tree limbs should not obscure the line. It's better to thin out underbrush than move a boundary line closer to the playing area and thereby perhaps force shots out of bounds artificially. A policy of fair play gives all possible playing room consistent with the need for clear definition.

Boundaries must have clear beginnings and endings, and extend as far as necessary to deal with errant shots. A boundary should not be drawn merely hole high with a putting green and then dwindle to nothingness—it should either be carried well past the green or turned off at an angle and completed in that direction. If the ball is not out of bounds but is interfered with by a boundary stake or fence post, there is no free relief—the ball must either be played as it lies or be treated as unplayable.

If this seems overly fussy, suppose you had to rule on a ball between two stakes whose position you couldn't tell until you stretched a string between the stakes, and then it fell across the ball, which therefore was in play because *all* of it was not out of bounds. That has happened.



The third hole, Princeville, Hanalei, Kauai, Hawaii.

Free Lifting; Ground under Repair

Tournament players sometimes say that if they can get their hands on the ball, they can save a couple of strokes in 72 holes—all legitimately, without hanky-panky. The more legal opportunities there are for lifting a ball and dropping or placing it, the more likely they are to improve their position.

Therefore, the condition of a course has a decided bearing on application of the Rules of Golf. The wise superintendent corrects problems of drainage and turf loss. Loose impediments are removed from fairway and rough, where feasible, because there's a penalty if the ball moves after you move a loose impediment. Divot holes are top-dressed. If there's jungle growth near a water hazard which could raise doubt whether a lost ball were in the water hazard or outside it, that gets attention because the penalties in the two cases can be different. Where feasible, guy wires and stakes supporting young trees are removed to reduce free lifting and dropping. So on a course where day-to-day housekeeping is alert and clean, you normally play the ball as it lies—and that is the first commandment in golf.

But even with good housekeeping, artificial relief is sometimes needed for fair play. Excessive rains may produce casual water. Sodding for turfgrass lost in very dry or very humid weather may become ground under repair. Location of obstructions such as protective screens, shelter sheds and scoreboards may give rise to lifting the ball without penalty and dropping or placing it more favorably.

Now what is casual water? It isn't just mud. Definition 8 says casual water is "any temporary accumulation of water which is visible before or after the player takes his stance (and which is not a hazard of itself or is not in a water hazard)." It has to be visible. It's temporary, and therefore its margins fluctuate and are not artificially marked.

But ground under repair should be marked. There is a tendency to be too liberal in determining what is ground under repair. The term now covers a multi-

tude of course sins, even though actual repairs are not being made. Sometimes a series of topdressings can level a sick area enough to avoid marking it as ground under repair. You don't give relief from every possible bad lie or for inferior shots. So before a championship the course is examined carefully, preferably on foot, and a policy is fixed, and inspection is made before each day's play. The PGA Tour limits ground under repair to areas which may reasonably be in play, generally in the fairway or near the putting green—and rarely outside the gallery ropes.

The person marking ground under repair must know the Rule for relief from interference. Under Rule 32-2a for play through the green, the player finds the nearest point which is (a) not nearer the hole, (b) avoids interference by the ground under repair, and (c) is not in a hazard or on a putting green. Then he drops within two club-lengths of that point. The Rule is the same for casual water.

Thus, it is not advisable to mark individually several small areas quite close together if a drop of two club-lengths from the relief point of one area would result in interference by another area. In such a case, all the little areas close together are encompassed within one larger section. Marking is done with white paint and a paint gun.

Sometimes fresh bad patches occur overnight or during play. A committee representative may declare an area as ground under repair even if not so marked. But care has to be exercised to treat a championship field equitably.

Material piled for removal is ground under repair. Clippings from putting greens should either be deposited where no golf ball will find them or removed completely; otherwise, if clippings are deposited near a green, a player may get a free drop and a better lie than his shot merited. All material piled for removal should be removed as soon as possible.

Bunkers; Water Hazards

Now a word about bunkers. Definition 14 says "A

bunker is an area of bare ground, often a depression, which is usually covered with sand. Grass-covered ground bordering or within a bunker is not part of the hazard."

A bunker is a trap for the unwary. But it shouldn't be a place to pile up strokes needlessly, as when a ball is lost in bunker sand. That ought never happen. How to prevent it? Use sand which meets specifications approved by the USGA Green Section, and give fresh sand opportunity to settle and not be fluffy. Fresh sand ought not be introduced less than three months before a championship.

Lips of bunkers can force honest recoveries. At greenside, bunker lips fronting the green are at least four inches deep; no lips at sides and rear. The lips should be angled slightly toward the green, or else be vertical. They never should be undercut. Unplayable lies can result from undercut lips and from lips at sides and rear.

Bunkers are kept as nearly free of loose impediments as possible—that is, stones, twigs, leaves and other natural objects. In a bunker, touching a loose impediment with the club before the downswing costs two strokes in stroke play or loss of hole in match play. Stones are dangerous. Rakes should be placed outside bunkers where least likely to interfere.

Defining limits of bunkers is almost impossible, especially on sandy seaside courses. But the written definition of a bunker helps—bare ground, often a depression, usually covered with sand; grass-covered ground is not part of such a hazard.

There are only two other kinds of hazards in the Rules—water hazards and their variants called lateral water hazards. The same Rule applies to them as to bunkers, but there are additional procedures for relief from water hazards. The last point at which the ball crosses the margin of the water hazard is the starting point for determining where a ball may be dropped outside the hazard. So delineation of the hazard margin is fundamental.

The best way to define water hazards is with continuous lines of paint sprayed on the ground. Yellow is used for water hazards, red for lateral water hazards. The distinction is necessary because lateral water hazards provide several options for relief. Small stakes may be used instead of painted lines, with six or eight inches exposed.

If the bank of a water hazard is sharp and sheer, exact marking of the limits may be unnecessary, as long as the type of hazard is indicated by an occasional yellow or red stake.

Obstructions

A prolific cause of ball-lifting is interference by obstructions. They are described in Definition 20 as anything artificial, except objects marking out of bounds and a few other things. A championship brings with it many temporary obstructions for gallery control and communications, including television. They must be located so as to be unlikely to interfere with play. But since that is literally impossi-

ble, special Local Rules apply.

As for obstructions already on the course, such as sprinkler heads, shelter heads, and artificial roads and paths, the Rules of Golf give free relief from interference. But every club, in locating an obstruction should try to minimize the probable effect on play.

The Putting Green

Finally, having played our way past all hazards and obstructions and other snares, we arrive on the putting green. This is the scoring zone, the place which reveals most strikingly the skill of the superintendent, or his deficiency. The condition of the putting green has more influence on scoring and Rules application than any other single factor.

In preparing for a championship, the objective is firm, keen greens, on the dry side. They provide the best test, for both approach shots and putts. You want the approach shot to stay on the green because of the skill with which the player strikes it—not because the greens are soft. The terrible tendency is to overwater, and it usually weakens the turf. As Fred Grau once said, you play golf on turf, not on color. Soft greens—or "puddings," as Henry Cotton calls them—do not reward the skillful player over the inferior.

Several years ago at Muirfield in Scotland, a few days before a Ryder Cup Match in September, the putting greens were quite dry, very firm, and very true. I asked the superintendent, James Logan, when he planned to water. He gave a hard-nosed reply: "Not at all. Last Thursday I locked up the hoses for the winter." You'd be hard put to find better putting greens than Muirfield's.

Firm greens promote the spirit of the Rules. Much gardening takes place on the putting green—repair of ball marks, removal of loose impediments, including sand (which is not a loose impediment anywhere else on the course), lifting and cleaning the ball. Some misguided souls are even now campaigning for a rule to allow repair of spike marks. Well, keen, firm putting greens help the ball run truly and minimize ball marks and other damage, especially in the holing-out area.

Margins of putting greens should be clearly cut—a ball may be cleaned on the putting green but not on the collar. Old hole plugs are repaired.

Rules and Greenkeeping for All Courses

The superintendent who plays his course can appreciate the relationship between good maintenance and the Rules of Golf. The same Rules apply to daily play as to a championship, and so should the same greenkeeping practices. They make for better golf, more enjoyment, and greater appreciation of the game. They strengthen the life of golf and the love of golf and the integrity of golf in a club. It's not stretching things to say that they strengthen the club.

Under such a set-up, our good friend Roberto DeVicenzo won't have to make his own rules, for if he deserves a 64, he can make it fairly.

Great Golf Courses of America

—Their Maint

by **TOM MARQUOIT**

General Manager, Olympic Club at Lakeside, San Francisco, Calif.

The budgets of courses that have a reputation of being great courses differ from the so-called average course. When given this assignment, I regarded it as very challenging since, really, the only budget that I had great knowledge of was my own. How was I to determine how other golf courses managed financially? How was I to determine what type of budgets they used and under what conditions?

It happened that at this time our club was greatly interested in installing an automatic irrigation system and in doing so, our golf course superintendent and I were instructed to visit nine other great golf courses in California to examine their irrigation systems. In the course of these visits, I spoke with many golf course superintendents not just in connection with their irrigation system, but also relative to their budgets. How are they handled? How are they prepared and how do the Boards of Directors at their clubs deal with them?

I also sent many letters to superintendents throughout America, especially those rated in the top 50 by Golf Digest. They were very helpful to me in gathering statistics for this presentation. I will relate to you my experience and my correlation of this data.

One of my first discoveries was that great golf courses do have higher budgets than those that aren't quite so great. The prime area of difference was in labor. In visiting two 18-hole golf courses in Southern California, I found a total of 37 workmen for wintertime work and 47 for summertime work. I found the better courses generally spend more on sand, seed and fertilizers, and they spend a great deal of money on irrigation maintenance and repairs. In many cases they have at least one mechanic and sometimes two to work on their equipment. I also found that great courses had improvements in progress or improvements planned to a greater degree than those courses not having a reputation of being great.

Another thing found at the finer courses was their capital outlay for equipment replacement. This is very interesting in that not every golf course superintendent or Board of Directors seems to recognize the importance of capital improvement for equipment. Not all the great golf courses visited or examined were wealthy golf courses. But it was for sure they were determined to be managed by a competent Board of Directors. The membership of the club wanted to retain or achieve greatness with their golf course and they did it with a great sense of pride.

During my trip through California and in analyzing

reports from throughout the country, I noticed that many budgets are padded with a safety margin. Generally speaking, this seemed due to poor planning or, in some cases, laziness on the part of the superintendent, the Green Committee or even the Board of Directors of the club. In many cases, it was simply a lack of knowledge and understanding of how to prepare a budget that appropriately predicted what costs would be in the coming year. Padding the budget was common and occurred mainly out of fear of criticism for being over rather than on or under budget expectations. More on this later in the report.

More Than Money

Another part of my assignment was to ascertain if there is more to a great golf course than just money. My observations tell me yes and that's for sure! The great golf courses have fine architecture and character and some get along quite nicely with less money than others. These are maintained with competency, enthusiasm and pride on the part of the superintendent. The game and the golfer come first with the employees, the manager of the golf club and the ideals of the membership. The members are interested and totally involved. Their desires are communicated to the Board of Directors, the Green Committee and the golf course superintendent. There

*Completely redone in the past year, the first hole, C
as though the glaciers*



enance Budgets

was just plain hard work involved for everyone concerned with those courses not having a lot of money. Their attitude was one of a willingness to sacrifice elsewhere to invest in the future of their golf course. The golf course is the very reason that the club itself existed!

How rigid should a budget be? That depends on the economic judgement and direction of the Board of Directors. I firmly believe the budget should be prepared by a superintendent based on historical data perhaps as far back as five years. That necessitates recordkeeping and accurate recordkeeping. Budgets should be prepared for the coming year based on all the known things that will happen; i.e., with regard to past experiences and the extent of the Board's planning objectives. Many unknown things happen in a year and they require some good guessing at allocating emergency budget provisions. But in any event, when the budget is prepared and approved, every attempt must be made to live within it. And that is not for the superintendent, but for the Green Committee and the Board as well.

The superintendent and the green chairman must take the time to explain to the Board their original budget as well as any revisions that may be needed during the year. Not everyone on the Board of Directors or Green Committee is an expert in

financial analysis. The superintendent and green chairman should show what is happening on the golf course if a budget is not up to snuff. Use films, pictures, illustrations, accounts, work sheets, comparative summaries. Everyone should be continually informed on a regularly scheduled basis. "No surprises"—that's the byword at Olympic Club.

Olympic Club is blessed with a fine, competent superintendent. He is competent not only in golf course management and architecture, but also in presenting a financial analysis of his budget and why it is or is not within the scope or frame of what has been allocated. Each month at our club every supervisor, including the golf course superintendent, receives a financial analysis of his performance for the past month. We spend a great deal of time with this document. We determine where we are right and where we have gone astray from our original projections. We record this information and project it into the coming year's planning.

Heavy Play

Does heavy play influence the budget? Experience at the Olympic Club tells me that it certainly does! Heavy play contributes to compaction. It affects mowing, irrigation and disease control. It affects grass recovery. Heavy play means it is going to cost all of us more money to operate. This has been our experience recorded over a period of four to five years. Heavy play forces us into rebuilding certain areas sooner than we may have anticipated. It hastens equipment repair and increases maintenance practices needed to overcome the problems it has caused. All in all, heavy play certainly does have an environmental impact. The impact undeniably costs money but, on the other hand, heavy play also means more income is generated to offset the increased costs.

Negative Factors

I would like to comment on what I believe to be negative factors affecting the budget. For example, the general economic situation in the community or in the country often dictates the feeling of the Board regarding what they would like to spend in the coming year. This feeling plus the current internal financial situation at a club significantly affects the budget.

Many clubs experience great food and beverage losses. These losses have to be made up somehow and often are a negative factor on the golf course maintenance budget. Clubhouse operations and improvements are costly to manage and funds are

Ocean Course, Olympic Club, San Francisco, seems left it this way eons ago.



often diverted from the golf course itself.

The presentation of a budget by the Green Committee and superintendent to the Board of Directors or governing body is sometimes poorly done. The Board reacts in a negative fashion because those presenting the maintenance budget haven't done their homework. They failed to provide the vital and necessary information on which the Board must base its decision. The problem is one of communication between those concerned with the turfgrass management program and those concerned with fiscal accountability. Back-up data, comparison sheets, and all other possible justification must be made for the funds requested. There is a lack of reality when a budget is comprised of waste and overkill and a fear of criticism.

To prepare a sound budget, the superintendent and Green Committee must have some sense of direction from management or the Board of Directors. The Board has a responsibility to lay out the general objectives of the club for the coming year. It is terribly frustrating to try to prepare a budget without having input from the Board of Directors. Deadlines have to be set for the presentation of the budget. Certain procedural formats should be followed. If the superintendent, Green Committee and general management of the club knows what is expected of them for the coming year, there will be few or no surprises in store.

I cannot overemphasize to the superintendent or Green Committee the importance of not fearing to prepare a budget that shows a deficit for the coming year. Dues increases or fee increases can then be planned to cover these expenditures. If the economic climate looks good, the Board of Directors or Green Committee tend to allocate funds requested by the golf course superintendent.

In talking to many superintendents, another negative budget factor is that of committee restraints. The Green Committee or the country club committee is often very short sighted in establishing their priorities. There is no appreciation or realization of long range goals; no objectives; no master plan. Even though the superintendent may offer these items during a meeting, the nature of committees being what they are (i.e., changing year after year), there is no continuity of planning.

Frequently, a Board of Directors will be comprised of one or more members who analyze every budget request strictly from an accountant's point of view. They look only at the bottom line and use it as a reference point for the entire club operation. Again, the realization is lost that the very existence of the club is for the golf course itself.

In talking with superintendents, I discovered another common complaint. It was that committees often attempt to compare one budget with another. "If club X spends \$200,000 to manage their 18-hole course, why do we have to spend \$275,000?" In order to recast costs on a comparative basis between clubs, a tremendous amount of homework must be



The 18th hole, Lake Course, Olympic Club, San Francisco.

done. I tend to doubt that these comparisons can ever really be valid with the degree of accuracy necessary.

Golfer Etiquette

Misuse of the golf course is a factor that creates higher than budgeted costs. For example, there may be quite a bit of outside tournament play at a course—not member play. At the Olympic Club, we have a continuing program of education for our members stressing the replacement of divots, repair of ball marks and proper handling and use of golf carts. This is especially important during inclement weather. But no matter how much or how hard we try to educate, we never seem to achieve our desired goal. Player indifference and misuse of the course cost a lot of money.

A recent innovation at our club in regard to outside tournaments is a provision that requires outside organizations to retain or hire additional golf course rangers. If there are 50 players or less in an outside tournament, the organization must hire one additional golf course ranger. If there are more players involved, two rangers must be hired. The care of the golf course and the proper operation of golf carts are the essential reasons for adopting this policy.

Automation

Every modern business must take advantage of automation whenever practical. The only alternative is increased operating costs. It was mentioned earlier that our 36-holes are irrigated manually. The irrigation system was installed in 1924 and requires three men full time during the watering season and several others part time during the summer. We are now investigating the installation of an automatic system. We feel that, conservative as we are, the time has come to automate in irrigation.

We have also experimented with several other means of automation over the years. For example, we tried the triplex putting green mowers on our greens. They served the purpose of automation and reduced labor costs. Unfortunately, they also did great harm to our greens. We have since discontinued their use and now cut greens with the power hand mowers. In every area possible, we must automate in order to keep budgets in line. We must continually study and keep updated on new innovations in equipment and operation.

Poor architecture also often contributes to higher costs. Greens and tees that are too small to use in inclement weather force development of temporary greens and tees. This means more work and higher costs until the original deficiency is corrected. Cart paths that are not properly maintained or regulations for the use of carts not adequately enforced damage the course, especially in inclement weather. A tree replacement and selection program is important in long-range planning. Future energy and water costs are definitely going to affect the budget of every golf course operation in America. At the Olympic Club, we are already investigating the use of secondary effluent water for irrigation and we are very much in-

terested in it.

Another item that will affect our budgets in the future is the permissible increase in non-member revenue from 5 per cent to 15 per cent. Those extra dollars, whether they be from food, beverage, or the golf course itself, tend to reduce losses and bring needed funds into the total operation.

The Olympic Club

I would close by commenting briefly on the Olympic Club's procedure in budget preparation. The supervisors of every department in my operation take part in the preparation and presentation of the budget. Most have records going back five years, and, based on these records and our own expertise, a new annual budget evolves. Every department head considers his needs for improvements and rebuilding projects. Everyone participates along with myself in the formal presentation of the budget to the Board of Directors. A written analysis explaining the financial impact on the club is also presented. Each month budgets are reviewed for each department with our finance committee and our Board of Directors. Periodically we update the budget to insure there are no surprises.

We have a fine and large club with over 650 people on the waiting list. Monthly dues are \$69 for which members have use of a large downtown athletic facility and two fine 18-hole golf courses. We have a very active and involved membership. Each day I deal with over 150 committeemen or commissioners that make up the governmental structure of the Olympic Club. Working together and keeping everyone informed and involved, we manage to maintain low costs throughout our operation. Good financial management is achieved because we have the fundamental foundation of sound budgeting.

Spectacular scenery on the Ocean Course, Olympic Club, San Francisco.



Great Golf Courses of America

—*Their Maintenance Crews and Equipment*

PANEL MEMBERS: Lloyd T. McKenzie, Superintendent, Augusta National Golf Club, Augusta, Georgia.

Richard M. Malpass, President Golf Course Superintendents Association of America; Superintendent, Riverside Golf and Country Club, Oregon.

MODERATOR: W.H. Bengueyfield, Western Director, USGA Green Section

Bengueyfield: Someone once said, "We are only as good as the people we have working for us." To put it another way, "An 'average' maintenance crew begets an 'average' golf course." Certainly the condition of any course is a direct reflection on the superintendent. What makes a good maintenance crew in your opinion?

Malpass: Men or women who know their job, are conscientious and capable. Individuals who give a dollar's worth of work for every dollar paid them. They should be courteous to golfers, take good care of their equipment and be proud of the job they have done and are doing.

McKenzie: A good crew should be carefully screened and hand-picked by the superintendent. They should have previous training or at least have the ability and the willingness to learn. If you find you have made a bad judgment in hiring a new employee, you should dismiss him before he damages the course or has a bad influence on other crew members.

Bengueyfield: How do you hire a new man and how do you train him?

Malpass: I always interview a new employee as well as have him fill out an application for employment. I try to find out as much about him as he will volunteer during the questioning. I try to determine his motivations: why he wishes to work for us and how he feels about golf course work. I often check references. As to training, one of the first things I give a new employee is an orientation map of the golf course. Then, he either works under my direct supervision for a time or with one of my more responsible employees to learn his new job. He is informed of company policies, wages, vacation, and any of the other items a new employee should know about.

McKenzie: Whether employees are new or old on the job, a continuing educational program for all seems essential. Working conditions and fringe benefits are important in maintaining good morale. If an

employee is happy with his work and takes pride in it, the course will just naturally be in better condition. I feel it is very important to retain key personnel on the maintenance crew on a year round basis.

Malpass: It is also important to keep your people well informed. We get enough surprises in life without compounding the problem by withholding important information on tournaments, special functions, club policy, etc. from the crew. I always pass along the compliments I receive on the conditions of the course and let the crew know their work is appreciated. Compliments are morale builders and the maintenance crew need them and deserve them. All too often, we work our hearts out to provide a beautiful facility for a golf tournament and not one word ever reaches the crew as to the good job they have done.

Bengueyfield: Is there really a difference between maintenance crews on great golf courses as compared with perhaps ordinary ones?

McKenzie: Great golf courses usually demand a higher quality of work from the employees and superintendent. Not that employees on other courses cannot do the work, but their superintendent is often limited by the number of manhours he can devote to the perfection of any one job. One thing great golf courses have over most courses is the necessary funds to do what most courses would like to do. There must be sufficient personnel and equipment to maintain a course at an expected level. It is up to the superintendent to justify his needs.

Bengueyfield: Would you then recommend a large crew at minimum wages or a smaller crew at competitive wages?

Malpass: I was too many years an employer with my own large farming operation to answer this question in other than just one way. I want good men. I want to pay them competitive wages, and I will get more and better work done with fewer employees. I continually evaluate my people. If there is something I see that they need to know, or if I can help them



Metropolis Country Club, New York, and the dog leg sixth hole.

perform their work more efficiently, I tell them. If they are doing a good job I tell them. Some type of an evaluation program is an important tool for golf course superintendents to use in developing their crews to the fullest extent.

Bengeyfield: What about crew organization? How is your crew organized?

McKenzie: I carry a basic crew of about 16 men for the 27 holes at Augusta National. During and preceeding the Masters Tournament, as well as during the summer when the course is closed but heavy construction may be underway, I hire additional men. But a normal daily program during the playing season may be as follows:

- 1) Green Mowing—I use seven men approximately 2½ hours a day to mow greens with walking mowers.
- 2) Tee markers and cups—Two men are used to move cups and tee markers. In addition, these men patch all tee divots with dyed dirt and seed mixture.
- 3) Fairway mowing—Two fairway mowers are used and each man carries a box of dyed green dirt to repair any areas that may be damaged while mowing. During the growing season, fairways are mowed almost every day.
- 4) Fringe mowing—Two fringe mowers are used almost daily to mow fringes during the growing season.

5) Tee mowing—Tees are mowed daily with a triplex greens mower.

6) Bunker maintenance—We have two men working daily in raking the sand during the busy season. We use approximately 556 tons of bunker sand each year. At the beginning of each season, most of the sand is replaced and even during the season the dirty sand is removed and replaced with fresh sand.

7) Course cleanup—I have one man who cleans the golf course almost continually during the playing season. He takes care of such things as picking up pine cones and other debris, raking straw, and repairing all damaged areas he finds anywhere on the course.

Augusta National has three men that have been with the club for 30 years; six men for about 20 years; four men for 10 years and three turf school graduates for about a year and a half. I believe crew stability is an important factor in good golf course maintenance.

Bengeyfield: If a golf course must have a limited crew, what jobs would you recommend for top priority?

Malpass: Those jobs that directly influence play. This means greens must be mowed frequently—daily if at all possible. Tees should be closely mowed and often. Fairways should be mowed several times a week and again at a close cut. Tee markers and

cups should be changed daily and irrigation levels must be closely watched to avoid overly wet conditions. These would be my priorities.

Bengeyfield: Why is it one superintendent will receive only a minimum effort from a crew while his replacement will receive a maximum effort. In other words, what are the responsibilities of a golf course superintendent in developing a sharp, efficient crew?

Malpass: This question can be answered with a quotation: "The successful manager of men derives his satisfaction from achieving with people. He takes real pride in surrounding himself with strong people and in helping them achieve. He recognizes that in a world which is changing economically and socially and which is accumulating technical knowledge rapidly, he and his people are confronted with the need to cope skillfully with these changes. To keep his business competitive in an everchanging society, he holds a very strategic position. Helping his people grow with the times is his opportunity and his challenge." Another quotation I like is: "A good executive is a man with a sense of urgency, a demand for excellence, and a healthy discontent with the way things are."

Bengeyfield: What about equipment on the great

golf courses of America? What is the most valuable piece of equipment on your course?

McKenzie: I have found the most satisfactory approach to equipment operation is to have each man assigned a specific piece of equipment for his use. Each greensman has his own assigned mower and he mows the same greens each day. The same fairways are mowed by the same man each day. By following this kind of pattern, each man is responsible for his equipment as well as for the job it does. It is important to maintain equipment in top condition and to replace it when needed. This is especially true for that equipment used most often and on the most critical areas of the course such as putting green mowers, fringe mowers, tee and fairway mowers.

Malpass: As to the most valuable piece of equipment on any golf course today, my answer would be—a pencil! In these days of ever-increasing costs, higher taxes, higher rates for labor, a good superintendent needs to examine every avenue to achieve maximum results with the resources at hand. He must be on top of new technical advances in his field. He must read his professional publications and he must attend his local, regional and national meetings. He must keep up or be lost in the dust.

Great Golf Courses of America

—Their Irrigation Systems

Panel Members: Joseph R. Flaherty, Superintendent, Baltusrol Golf Club, New Jersey

Carlton E. Gipson, Director of Golf Courses, The Woodlands, Texas

Moderator: Stanley J. Zontek, Northeastern Director, USGA Green Section.

Zontek: To start things off, would you tell us about the type of irrigation systems at your course?

Flaherty: Baltusrol is located in New Jersey and we have predominately bentgrass fairways, tees and greens. We have an automatic, electric, two-row system with master and satellite controllers. Our main lines are of asbestos cement pipe and 99 per cent of them run through the rough areas with plastic lateral lines into the fairways. The polyethylene lateral lines are only under pressure when the sprinklers are operating, but the asbestos cement main lines are always pressurized. On our 36 holes, we have 46,000 feet of asbestos cement main line and roughly 250,000 feet of polyethylene lateral lines. We have four deep wells plus a connection with the local water company. When we need it, we can obtain 500 gpm from them. In all, we have

available, 1,200 gpm for our two golf courses. We can cover from tee to green in a 12-hour cycle. Greens are never watered at night. They receive irrigation in the morning hours and always after they have been cut.

Gipson: Texas is bermudagrass country and we use 690 heads in a two-row hydraulic system. We have Tifdwarf greens, Tifton 419 fairways and common bermudagrass roughs. We have PVC pipe and a pumping station with a capacity of 1,300 gpm. We can irrigate the entire golf course in eight hours.

Zontek: What is your basic irrigation schedule?

Flaherty: I'm sure there are basic schedules for every part of the country depending upon climatic conditions. However, our regular night schedule calls for the operation of 33 valves (66 sprinklers) on half-hour shifts. During periods of high tem-



Heave-ho me lads heave-ho, a sailing we will go.

perature, humidity and cloud cover, we cut this schedule at least in half and do not start irrigation until 6 o'clock in the morning. Then we begin on the first hole and stay ahead of the golfers. If syringing is needed by mid-afternoon, we use manual hand operation techniques. The master controller is never used for syringing. Around greens, at least half the watering is still done by hand with hose and nozzle. It is difficult to irrigate the greens as well as collars and banks perfectly with an automatic system. Therefore, I put just enough water on the greens to carry them through the day and hand water collars and banks as needed when wilt develops. We have not by any means eliminated hand watering around our greens.

Gipson: We follow about the same program and do some hand watering on the banks and use roller sprinklers. Actually, we water as little as possible; seldom more than 10 minutes a night. But we do get an awful lot of rainfall and must be very careful about overwatering with the system.

Zontek: You are both concerned about applying too much water through the irrigation system.

Gipson: I don't know of a better way to put it.

Flaherty: It's just good business to put on just enough water to carry the grass. If we put on enough water to bring the soil to field capacity and then get a rain, we have no way to get rid of the excess water. Of course, there is a great temptation to put on too much water because everyone likes to have the course as green as possible. However, I found whenever I apply a little bit too much water we have more disease and more problems. It brings me back to letting things get just a little bit off color rather

than have them lush and green all the time.

Zontek: If you were an irrigation engineer, what would you change in irrigation design?

Gipson: In installing about five irrigation systems, I find myself making a few changes each time as I go along. For example, I've found that quick couplers should not only be installed on each green and tee, but I want some in the fairway landing areas as well. There is just no way you can properly irrigate a golf course with an automatic system alone. Quick couplers are needed and if you try to get along without them, you are going to be in trouble.

Flaherty: I think most problems lie with the original design of an irrigation system. I'm talking about the physical layout of pipes and sprinklers and controllers and drainage. At Baltusrol, we retained a local hydraulic engineer who did the design of the system first and then we looked for the equipment for installation. I spent a great deal of time with the engineer. Together we did our best to tailor a system to fit our golf course. Then we selected the equipment to fit our system. To be very honest, if I had to do it over again, I don't think I would make any basic changes in this system. The original design was good, the equipment is good and it has worked beautifully for us.

Gipson: I think an automatic system should be as simple as possible. We don't need more sophistication, more complicated controllers, etc. You cannot program water 14 days ahead of time—at least not in my country. What the golf course superintendent needs is an automatic system that can be operated as simply as possible and one that he can repair (including the controllers) on the golf course.

Please, don't make automatic systems more complicated.

Flaherty: I couldn't agree with you more, Carlton. The last thing in the world we need is a system that needs an engineer to operate it and keep it in repair.

Gipson: I think a point we would both stress is that of proper automatic irrigation system installation. The best possible design can become all but useless if it is not carefully and properly installed.

Zontek: Do you think the irrigation system you have contributes to your great golf course?

Gipson: Automatic irrigation systems give us a higher degree of flexibility in carrying out our irrigation program. We try to keep enough moisture in the ground to keep the grass growing at an optimum rate. We try to achieve this level with the automatic system because it can be precisely controlled. However, if additional water is needed during the day, it is applied by hand or manual operations. Of course, automatic irrigation is very valuable when applying chemicals and fertilizers to avoid the possibility of chemical burn.

Flaherty: The biggest temptation in automatic irrigation is to put on too much water. This is easy for me to say, because we are in the process, and have been for several years, of trying to keep *Poa annua* out of our fairways. Consequently, I use less water than the superintendent who has predominately *Poa annua* on his course. In the latter instance, you have to put on more water than you should in order to carry the grass through a hot spell. It's surprising, but some members don't object to a few brown spots here and there once they become used to the idea. The best golfers are more concerned with the lie they get on the fairway than the color of the grass. Of course, they do not want it burned up or brown. How-

ever, if it's a little off color and they still get a good lie, they prefer it to soft, spongy turf. This is one of the big points in championship golf. The lie is the thing. On the other hand, if you are attempting to maintain *Poa annua* fairways, it's tough not to have the fairways wet. It think it is impossible not to have them too wet at times.

Zontek: What are your comments concerning the future of golf course irrigation?

Gipson: At the Woodlands we are building an entirely new town and we project 140,000 people there by 1990. We plan to start using effluent water from the disposal system on our golf courses as soon as possible. I used effluent water for golf course irrigation on a golf course in Mexico City in the early 1960s. The price of domestic water was just out of reason and a disposal plant was installed. It cleaned the water and we used it very effectively on the course at little or no cost.

Zontek: In summarizing our discussions, it seems safe to say that Great Golf Courses are not overwatered. In fact, they probably tend to be on the dry side with firm, fast greens. Tees should also be firm and fairways should not be wet and soggy. This is the type of playing conditions most golfers want today. A few high and dry brown spots are really not objectionable. They are not a sign of poor water management, but rather a sign of good and careful water application. One can always add water to any turfgrass area but it is almost impossible to remove an excess of it. Green and lush golf courses may look good, but they do not play well.

Irrigation systems contribute greatly to any golf course. It is how well the course plays—not how long it is or how short it is. Hopefully, it is the ball dropping into the cup in the fewest number of strokes.

A little too much water.



Great Golf Courses of America

— Their Bunkers

Panel Members:

Edwin B. Seay, President, Americal Society of Golf Course Architects, Ponte Vedra Beach, Fla.

Bobby McGee, Superintendent, Atlanta Athletic Club, Duluth, Ga.

Moderator:

Carl Schwartzkopf, Mid-Continent Director, USGA Green Section

Schwartzkopf: Gentlemen, I'm looking forward to your individual discussions of bunkers on the golf course. As both a golf course worker and golfer, I have spent more time than I care to recall in bunkers. Ed Seay, would you present your paper first?

Seay: Bunkers alone not only influence, but can completely dominate the mood, playability and overall interest of a given golf course.

I am often asked, "What size, shape, depth and kind of bunker do I prefer?" My answer is simply that any given course should have as many different kinds of bunkers as possible. If all were the same, the monotonous effect on play would be no less than if every green on the course was of the same design.

Bunker design is strictly the option of its creator. The free form and irregular shapes of today's bunkers may appear to have no reason why they meander and finish up where they do. But in actual fact, it is quite the contrary. Sensitive golf course architects are very much aware of the effect on the player of a single errant wing or finger of a bunker.

I prefer to see a course that has very large to very small bunkers and all sizes in between. I prefer loose and natural shapes to the modern free form shapes. Actually, there is very little difference in their construction. To me, however, there is a tremendous and fantastic difference in their finished appearance. (See Sketch A).

I also prefer varying depths of bunkers throughout a course. For example, a player whose shot barely misses the ideal spot in the fairway and just rolls into a bunker, should have a much easier recovery shot than the player whose shot is more errantly off line and lands well within the bunker.

Another question frequently asked is "How many bunkers should be designed into a course?" There is no rule of thumb on this point, nor should there be. Nevertheless, the importance of incorporating bunkers into the design of a golf course deserves very high priority. Their number should

depend strictly on their intended purpose and need from both a strategic as well as aesthetic point of view.

Bunker Placement

The reason a bunker is placed where it is on a particular hole can generally be explained in one of the following ways:

Preventive—	Protective—	Directional—
Definitive—	Aesthetical—	

All of these reasons are important and should be considered in bunker design throughout the golf course. The placement of bunkers alone can specifically design the type of hole confronting the player. Bunker placement can set up a hole as penal, strategic or heroic. (See Sketch B).

Today's courses are generally designed with the varying skills of all players in mind. The golf course architect gives a tremendous amount of time and consideration in determining the proper location of bunkers so that all players will be equally challenged. Many of the earlier constructed courses have fairway bunkers which are hazardous only to the high handicapper, the shorter hitters or the ladies. They offer no challenge to the better golfer.

Bunker Sand

Four million articles have been written, 10 million laboratory tests have been made and there are some 7,000 sand quarries in the United States. Unfortunately, the standards of grading sand and the methods of testing sand are not the same in any one of these tests, so the qualities you get in one area will not conform with that you may find in another.

In 1972, the USGA Green Section adopted and published a standardized classification for sand. They further adopted the range from medium to coarse sand for use in bunkers. No larger than 1.0 mm and no smaller than .25 mm was suggested.

(A copy of *Sands for Golf Courses* is available from any Green Section office listed inside the

Bunker Construction

Golf course architects have a number of options available when constructing bunkers. They may be:

- 1-Formed on existing natural terrain.
- 2-Formed into constructed earth features (mounds, slopes).
- 3-Depressed (cut) into existing slopes.
- 4-On grade—low profile with low face and lip.
- 5-Elevated—high profile, high face and lip.

Regardless of how well the architect satisfies his intended purpose for a bunker (whether strategic or aesthetic), the bunker must function mechanically. By that I mean it must have good surface and subsurface drainage. Its sand should not wash off the face in a storm or after irrigation, and the lip should remain stable. The sand should not wash out or be blown from the bunker.

Poorly constructed bunkers frequently have a breakdown of the lip and almost always require constant maintenance in trying to keep the sand from washing off the steeper faces. By cutting the face of a bunker in a concave manner and packing the sand in depths of eight to 12 inches beneath the lip, lip breakdown is prevented and, in most cases, the washing away of the sand from the face is eliminated. (See Sketch C).

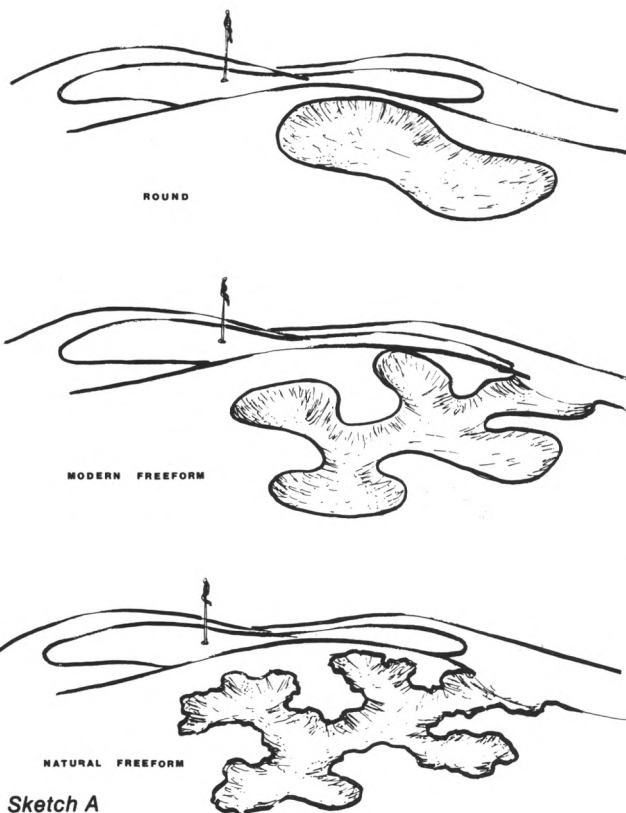
A lot of criticism that bunkers receive relating to their high maintenance costs is sometimes due to the errors and oversights in their design and construction: base grade (bed), slopes too severe, convex or straight faces, no subsurface or surface drainage, etc. More and more attention is being given to bunker design and construction and hopefully we are learning not to make the same mistakes twice.

Without question, good maintenance of a bunker plays a major role on any golf course. The mechanical sand trap rake has been a tremendous aid. The architect can do his best in proper design, depth, size, perfect placement, the proper sand and proper construction. However, if the crew does not sensitively take care of the bunker and understand why it is there and why it is that deep and in that shape, we lose much of the effect. Very few players enjoy a course where the bunkers are wet, trashy and the sand has blown out.

In conclusion, even with all the adverse and negative comments concerning the maintenance of bunkers, they continue strongly to defend themselves (with the superintendent's help) and remain a feature in golf course design that will never be replaced. Nor should they be.

Schwartzkopf: And now to a superintendent's view of bunkers and Bobby McGee of the Atlanta Athletic Club.

McGee: I've always wanted to follow an architect in a discussion of bunkers. Now I have my chance.



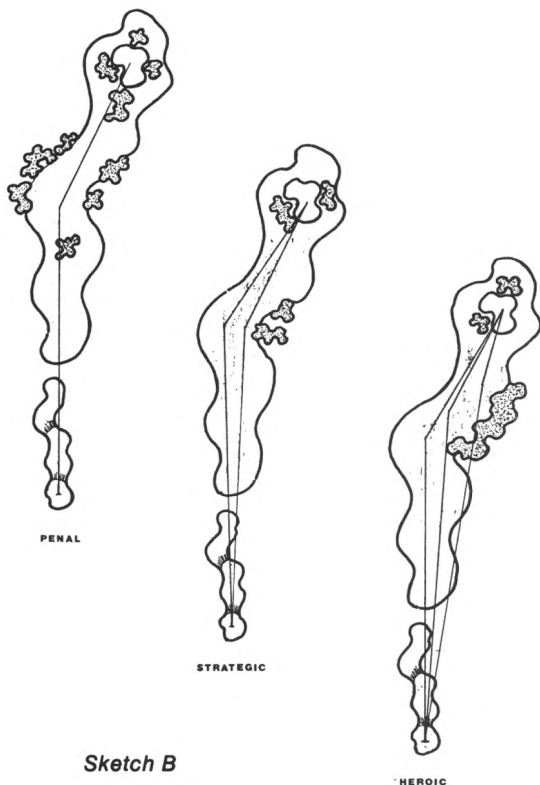
Sketch A

When speaking of bunker maintenance, the basics are somewhat simple and yet, when we carry them out—i.e., the raking of sand, proper edging, whether it be to establish a lip or to keep the grass from growing into the bunker, or just keeping bunkers free of weeds—these tasks can sometimes become quite complex. We have various tools to do these jobs, including the motorized bunker rake. Remember, the motorized rake will save us money and will save us time. In many cases, unfortunately, it must remain in the maintenance building. I have experienced this on the new bunkers on our Highland Course at the Atlanta Athletic Club. Their design simply will not accommodate the mechanical rake!

The problems of bunker maintenance really begin when construction begins. A lot of thought should go into bunker construction. I think they deserve as much thought, as any other part of the golf course; in some cases they deserve more thought.

Drainage, as an example, is absolutely necessary in our part of the country if you are to have a playable bunker and maintain it economically. The Georgia red clay at the Atlanta Athletic Club holds water like a bathtub. Therefore, drainage must be the most important part of both exterior and interior bunker construction. Any bunker constructed so that water may run into it from the surrounding area is a total disaster.

The drainage of many bunkers is based upon the old sump idea. You go to the lowest part of the



Sketch B

bunker, dig a hole, and from there you install a tile line leading off to a lower area somewhere in the rough. That's it! Quite frankly, this does not do the job. It may work for a while, but over the long haul there must be good drainage inside each bunker. Of course the size of the bunker has something to do with it. If it is small, you might get away with the sump idea. If it is quite large, you will need a thorough drainage system.

In talking about bunker construction, one tends to wonder why we say all these things are necessary in building bunkers. After all, architects are trained in the work. Golf course builders have experience in installation and drainage. Superintendents know what the problems are and how they can be corrected or avoided. What happens when things go wrong and mistakes are made? One of the main problems certainly is a lack of communication with all parties concerned; the owners, the architect, builder and superintendent. We must all work together to achieve the desired result. If we do, we will have a bunker that is properly built, that can be maintained in an economical manner, and above all one that can be kept playable at all times for the membership. When we fail, we point to the other fellow.

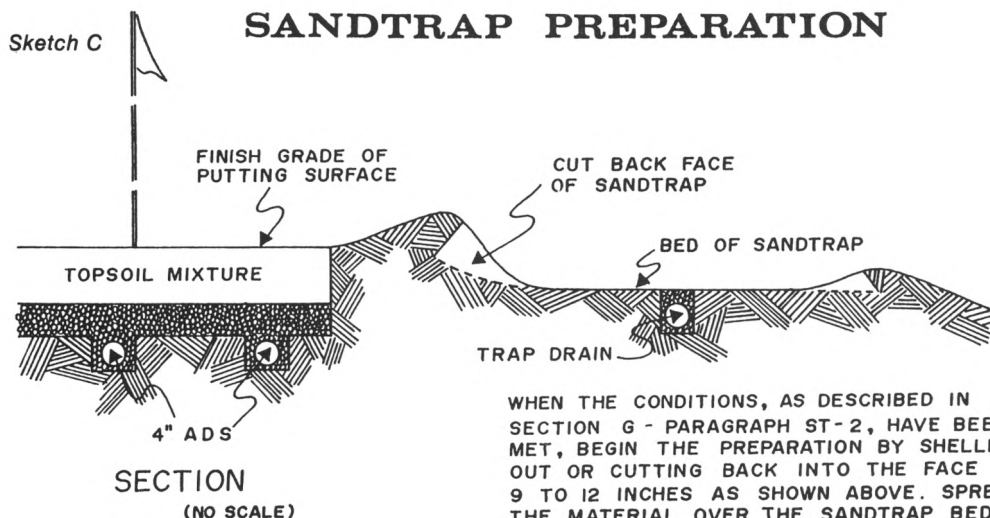
A few nights ago while talking with some golfing friends, I was asked about my participation in this USGA Meeting. "What are you going to tell them?" they asked.

"I'll be talking about bunkers", was my reply. With that one of them just laughed.

"What can you say about a hole in the ground with sand in it?"

"Not much really, except that's not a bunker."

There are a lot of bunkers around this country and, indeed, all over the world that are just that—"a hole in the ground with sand in it." In fact, I have checked with many superintendents recently, and not surprisingly, many of the great courses have undergone severe bunker renovation and improvement and no longer have just holes in the ground. They have accomplished many of the tasks we have discussed in this panel. They have brought the level of their sand bunker maintenance up to the standards of the rest of their course. That's probably one of the reasons why they are great golf courses.



WHEN THE CONDITIONS, AS DESCRIBED IN SECTION G - PARAGRAPH ST-2, HAVE BEEN MET, BEGIN THE PREPARATION BY SHELLING OUT OR CUTTING BACK INTO THE FACE 9 TO 12 INCHES AS SHOWN ABOVE. SPREAD THE MATERIAL OVER THE SANDTRAP BED.

PACK WHITE SAND INTO FACE TO A MINIMUM DEPTH OF 8 INCHES AND OVER THE TRAP BED 4 INCHES.

Great Golf Courses of America

—Their Paths and Roads

Panel Members:

Wm. H. Bengeyfield, USGA Green Section, Western Region
Wm. S. Brewer, Jr., USGA Green Section, Northeastern Region
J.B. Moncrief, USGA Green Section, Southern Region
C. Schwartzkopf, USGA Green Section, Mid-Continent Region
J.B. Snow, USGA Green Section, Northeastern Region
S.J. Zontek, USGA Green Section, Northeastern Region

Moderator:

Wm. G. Buchanan, USGA Green Section, Mid-Atlantic Region

Buchanan: With the introduction of the electric golf car in the 1940s, it was soon evident that some kind of surface path would have to be provided if turf was to survive on heavily trafficked areas. What about the evolution of cart paths and roads on America's golf courses?

Moncrief: Over these 30 years, we have seen everything from shale, sea shells, sand, wood chips, pine needles, rubber composition materials, asphalt and even green concrete used in cart path construction. Paved service roads for heavy maintenance equipment have also become a necessity.

Bengeyfield: Yes, and we have seen the width of the paths increase from 3½ feet to 10 feet or more. I suppose most golf carts are now five feet wide and therefore most paths are six feet wide today. This allows six inches on either side of the cart for error and most drivers seem to need more.

Snow: It has been my experience that when blacktop is being installed, an eight-foot width is often nearly as economical as a six-foot path. It seems blacktop equipment is set up for eight-foot

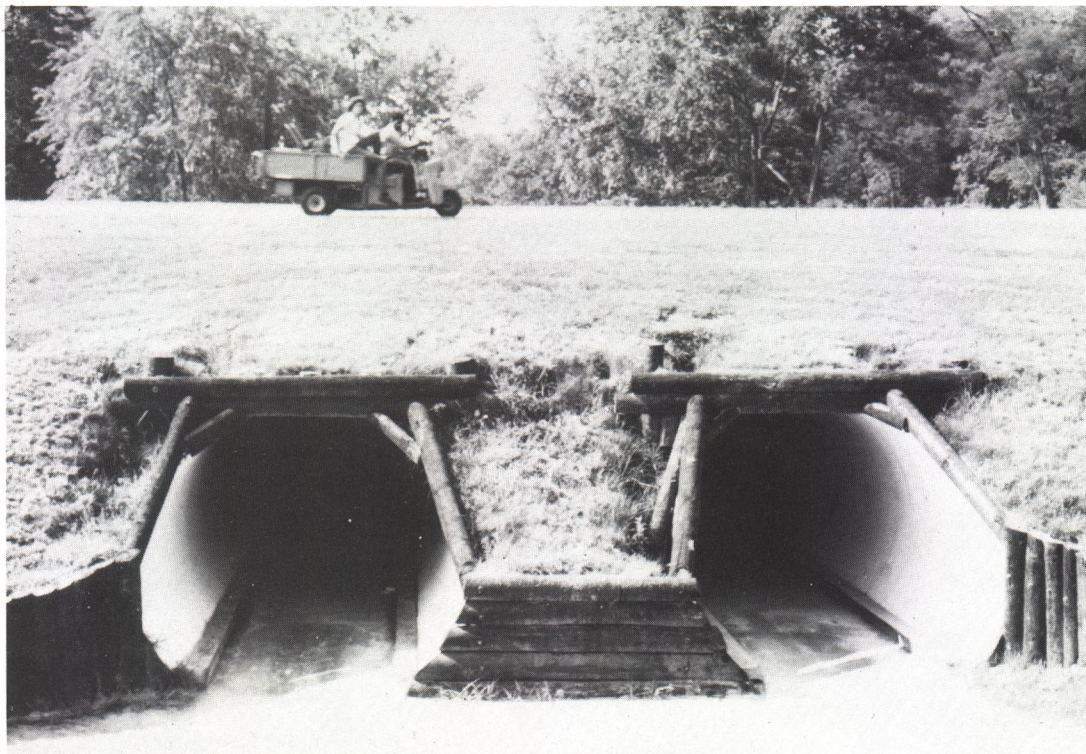
wide installations. But of course, there are many golfers in clubs where an eight-foot wide path is not a welcomed sight.

Schwartzkopf: The acceptance of cart paths is a serious and growing problem. Cart paths are sorely needed to save the turf, and they also help many members extend their playing days. Nevertheless, more and more concerned golfers object to the proliferation of cart paths. They feel it is harmful to the game, the Rules of Golf and the beauty of their course.

Snow: It is a growing problem! From a survey we recently conducted, some clubs have made the commitment not to rely exclusively on carts, but to encourage a return to caddies and walking rounds of golf.

Brewer: It is interesting to note that at three of *Golf Digest's* 10 Great Golf Courses in our survey, we found a total of 79,000 rounds of golf played last year. Of these, 74,000 of them (or 94%) were walking rounds on the three courses. Some golfers, it seems, still like to walk!

Keep to the right!





Surfaced paths are turf savers.

Zontek: There is no doubt that some people, and perhaps their numbers are growing, like to walk the golf course. They feel more comfortable. They play better and they enjoy the game more. But we can't deny that a majority of golfers apparently prefer to ride.

Buchanan: What about speed of play? Do golf carts really speed the game?

Brewer: There have been reports about informal clockings of some players over the same course with and without golf carts. Even where carts were not restricted to paths, there was little appreciable increase in the speed of play by those golfers using carts.

Bengeyfield: Yes, I've heard of similar surveys and I'm sure the cases cited are accurate. Thankfully, there are still those who can walk 18 holes in three hours or less. But in the broad view I'm convinced more rounds can be played over 18 holes in a day's time if everyone uses a cart. Whether this is good or bad depends upon one's point of view. But at a resort course, or one heavily played, the maximum number of rounds per day is an essential ingredient in the economic health of the operation.

Schwartzkopf: Just in the past year, one of the great golf courses of America—which is also a popular resort course—installed cart paths to minimize turfgrass wear. Let me read two newspaper headlines which appeared soon after; "From Tee To Asphalt Jungle," reads one. The other, "Cart Paths Desecrate The Golf Shrine."

Zontek: Perhaps objections to cart paths can at least partially be overcome through careful planning and location. There is no consideration given to the game when a path runs down the middle of a fairway or continually comes into play around a green. And we have all seen examples of this.

Buchanan: In other words, the first consideration is due the game, not the convenience of a cart path or a player.

Zontek: Exactly!

Buchanan: Let's touch for a moment on the installation of cart paths. What are some of the considerations they deserve?

Moncreif: At least in bermudagrass country, some type of chemical sterilent should be used under the roadway to retard root growth. Otherwise, it isn't long before the roadway is invaded and deteriorates.

Snow: A well-drained sub-base is also important. Regardless of the type of material being used for the surface, a 4-inch layer of crushed stone or gravel sub-base will add years to the life of the path—especially asphalt. Asphalt should also be sealed periodically to protect its surface.

Audience Comment: In Michigan, we have found we can put four inches of asphalt down on a good solid base and get anywhere from eight to 10 years of good serviceability before the path begins to deteriorate.

Zontek: A gravel base is expensive but we have found far greater longevity of the path where the four-inch gravel base is used. It seems especially helpful in areas where there is a great deal of freezing and thawing through the winter.

Brewer: There is a new development in cart path materials this year and it seems especially promising for the worn areas at the end of cart paths. The new plastic or masonry honeycomb cells seem to reduce turf wear and soil compaction. I don't know how this material will "play," but it does deserve investigation and further testing. It is far more pleasing to view than asphalt or concrete.

Moncreif: Of course asphalt and concrete paths are often used for surface drainageways as

well. They do an excellent job. Either concave or convex construction will carry water away from critical playing areas.

Snow: Curbing also helps in this regard. In fact, four- to six-inch curbs help keep carts on the path near tees and greens. If the back side of the curb is leveled off with soil and grass is encouraged to grow here, it is easy to maintain with a regular mower. Hand clipping will not be necessary. Carts remain on the path, and worn areas along its side are greatly reduced if not eliminated.

Brewer: As grass growers, perhaps we can do more to encourage grass to grow on heavy traffic areas. For example, choosing the right grass, adequate aeration, fertilization, irrigation, etc. Once the turf shows signs of wear, you must raise the maintenance level in that area or divert the traffic or put in a cart path or road.

Moncrief: According to Dr. Glenn Burton, of Tifton, Ga., some of the hybrid bermudagrasses are withstanding traffic better than common bermuda or other types. I believe plant breeders are developing more wear-resistant grass varieties. The improved perennial ryegrasses also illustrate the point.

Buchanan: Gentlemen, it seems we all agree that, as cart usage increases or is concentrated in particular areas near greens and tees, the need for some kind of path or roadway also increases. The degree of wear depends also on what type of soil you have, the type of grass, the management of it and the climate of the area. Carts are especially necessary if the course is frequently played under adverse weather conditions.

Up to a point, the "scatter" principle, or "roam at will," seems to work fairly well on fairways. But with increased cart traffic and increased maintenance costs for repairs, certainly there should be income enough from cart usage to pay for turf repairs and cart path installations and upkeep.

As to the control of carts and their ownership, control seems best achieved if it is in the hands of the club or professional. By control I mean the granting of permission to use the cart on the course on any given day and in maintaining proper tire size, tire inflation and etiquette in cart use.

The golf cart problem may always be with us, but I thank you gentlemen for contributing to a better understanding of it and the use of cart paths and roads.

The Invisible Men

by FURMAN BISHOP, Sports Editor, *Atlanta Journal*

The biggest subject of gossip around any golf course is not the pro, not the nifty feminine member behind whom all the panting male members want to play. Nor the sandbagger with the 18 handicap.

It's an invisible man. You know he's there, but you never see him. He might have lunch at the next table in the men's grill, but you wouldn't recognize him.

He's a kind of Santa Claus with a green thumb. He works while you sleep. You go to bed at night and wake up the next morning to find that he has achieved wonders.

He probably couldn't break 100. It's possible the only club he ever swung was a pick. (That's a No. 2 club in your gardening bag.)

The spring breaks, the greens are like parlor rugs, the fairways look like long verdant hallways through the forest and the rough is but yet only tender sprouts, all the members go about cooing, "The course is in the greatest condition I've ever seen." They're talking about the Unseen Man with the Unidentifiable face.

The winter has been rotten. The course a bog from rains that turn the fairways to ponds and the color to brown. Greens are patchy. Bunkers have

washed. April comes and the course looks like Sulphur Pits 9-Hole Municipal Links—though it's 1,000 miles from any ocean—\$1.50 a round. You curse him. You're not sure who, but you curse him.

You've never met him socially, but you invite the Lord to join you in bringing down an avalanche of wrath upon him. Your putt hits a patch of poa annua, you assail his parentage. Your drive hits a sign that says, "No Carts Today," you demand an immediate face-to-face with him.

You discover that he is real. Flesh and blood. A very tranquil man with cool, clear eyes, and in condition to swim the rapids—upstream. Chances are, he wouldn't know a Calcutta from a church bazaar. But he knows grass, and how to grow it. Basically, that's his business—grass-growing, and barbering it.

Mostly, he's referred to as "the greenkeeper," a rather pleasantly bucolic term. As a group, they refer to themselves as "golf course superintendents." They have a national organization called "Golf Course Superintendents Association of America." They didn't get off some hay mow and come to town. They study for it, and they're as devout toward their duty as monks.

They don't wear bib overalls and dip snuff.

They use words longer than some of your putts. One of the topics at their annual convention this year will be, "Turf Management: A Synergistic Approach."

That's one you don't hear being thrown around the locker room, or over the gin table.

Golf was moving across the ocean in the 1920s, and Edward J. Casey decided to move with it. He was an engineer's apprentice in London, had fought World War I with a wrench and calipers, repairing His Majesty's military rigs. Some of his cronies had turned to this golf, and he went with the crowd.

When he arrived at the Baltusrol Golf Club, near Springfield, N.J., in 1945, Ed Casey had learned his trade by rote at three other clubs, and put on the finishing touches in agronomy classes at the University of Massachusetts. He was officially a Course Superintendent, and his address was one of the classic addresses of golf in the USA.

There are good greenkeepers, and there are those who should be mucking stables. Some are Ed Caseys, good men of exceptional judgment, hard, steady hands, and acutely aware that you can't rush Nature. You can nudge it along, but don't hurry it.

His career in the USA has covered everything, from the primitive times when greenkeeping was done, virtually, with a fork and a spade. It's such a science now, grasses are afraid not to grow.

"When I got to Baltusrol," he said Friday at lunch, "sheds were filled with tobacco dust. That was our 'insecticide.' It was supposed to be the cure for everything. It wasn't worth a damn."

Then there was the Arsenate-of-Lead Era. "We

loaded the course with it," he said. "It's a wonder half our members didn't die of lead poisoning."

Casey has prepared Baltusrol for four U.S. Golf Association championships, including two Opens. He did it so well the last time, Jack Nicklaus broke the Open record on his handiwork. After that Casey retired. No connection. It was simply time to go. The year was 1967.

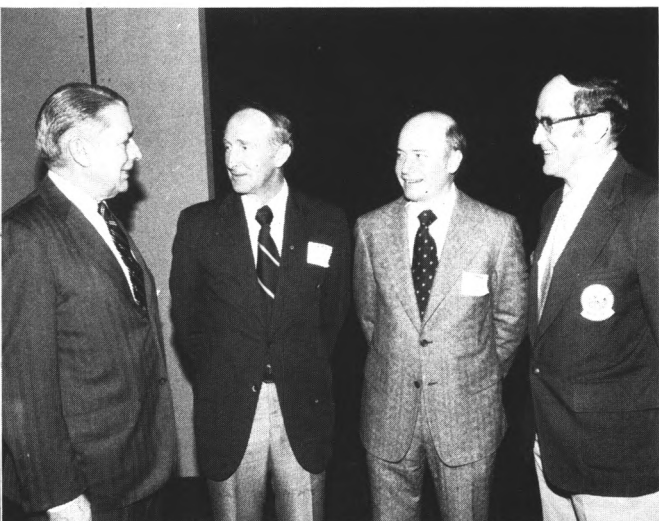
It isn't a romantic story, the legend of the greenkeeper. Rife with chinch bugs, army worms, digger wasps, drought, flood, fungi and members who won't repair ball marks. But without these knights of the maintenance barn, golf is a bogey.

Ten years later, the USGA called Ed Casey before its convening body and saluted him. He was presented the annual USGA Green Section Award for distinguished service to golf through work with turfgrass.

He was the fifth superintendent to carry off one of the plaques. It wasn't simply for Ed Casey alone, it was for all the Good Ones. So, on your feet in the men's grill, and hoist your cup to them. God knows where we'd all be on the weekend without them. Probably mowing the lawn.

(Editor's Note: Mr. Furman Bisher is the Sports Editor of The Atlanta Journal and wrote the above article for that paper on January 30, 1977. It is reproduced here with his permission and our thanks. It is a tribute to Ed Casey and all golf course superintendents.)

Speakers at the 1977 Green Section Conference in Atlanta included (left to right) Joseph C. Dey, Jr., Lloyd MacKenzie, Tom Marquait, and Richard Malpass.



Also speaking in Atlanta were Dr. Glenn Burton, James Gabrielsen and George Brodnax III.



TURF TWISTERS

THIS WINTER AND BERMUDA SURVIVAL

Question: This has been the most severe winter along the eastern seaboard since records have been kept. What will the cold weather do to our bermudagrass? (North Carolina)

Answer: The answer will rest pretty much with what the late winter and early spring will bring. If we have a normal transition from winter to spring, the bermuda should survive quite well. However, if there are a series of hard freezes and thaws during the months ahead, bermuda could be seriously damaged.

THIS SPRING AND NON-EDIBLE FRUITS

Question: This spring, is there anything I can do to reduce the fruiting of my flowering ornamentals on the course? When this non-edible fruit drops, it is a real mess to keep cleaning up. (New York)

Answer: Yes. To help hold down fruit of flowering ornamentals, you can apply Seven (Carbaryl) 50% W.P. at 2 pounds of material per 100 gallons of water two to three weeks after the full bloom of the ornamental—when the petals are almost formed. For best results, don't use any surfactants and try to let it dry well on the plant.

THIS RAKE AND THIS BUNKER

Question: Would you help us settle the question once and for all? Where should rakes for sand bunkers be placed; inside or outside the bunker? (New Mexico)

Answer: Outside the bunker and where least likely to interfere with play. (Be sure to read Joseph C. Dey, Jr's., article in this issue on Great Golf Courses and The Rules of Golf.)

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