

SEPTEMBER 1974

USGA GREEN SECTION RECORD

A Publication on Turf Management
by the United States Golf Association

*Green Committees;
Holding Costs in Line*

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Kitsap President Henry Blownier and Green Chairman Con Davies inspect a seepage problem as old as the golf course itself.

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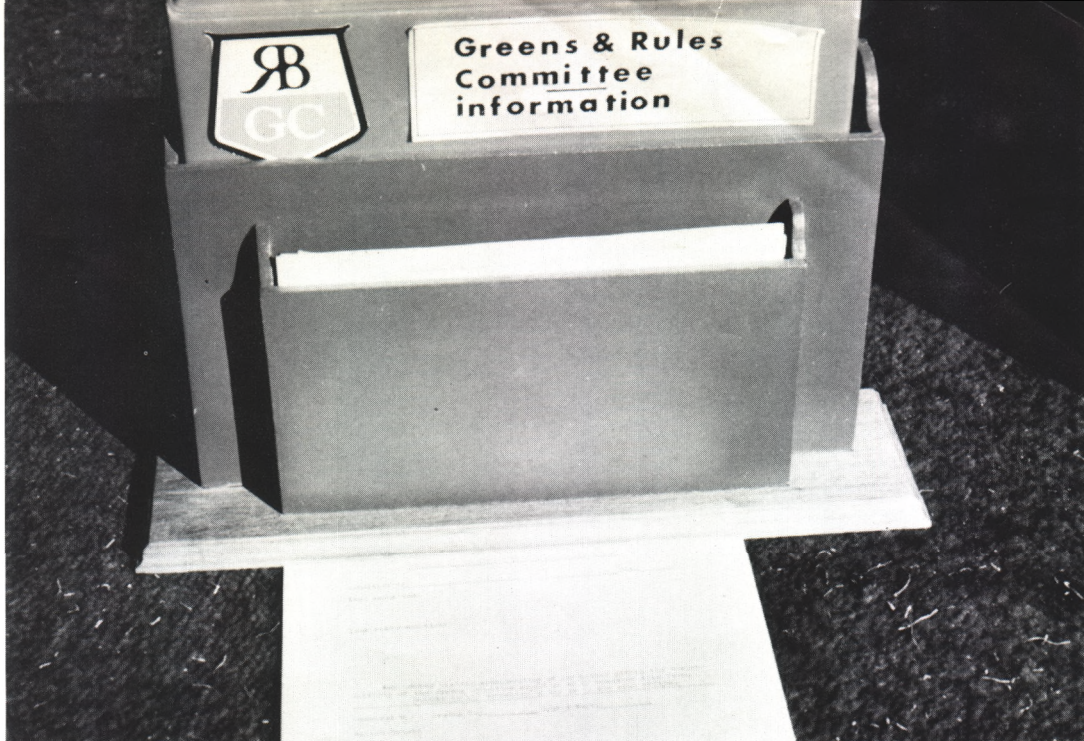
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Keeping the membership informed.

Running A Tight Ship Without Sinking It

by WILLIAM H. Bengeyfield, Western Director, USGA Green Section

In perhaps the most costly era ever known to golf course maintenance, the search is on for new ways to run a "tight ship." Plagued by rising costs and hobbled by heavy play and demands, the chairman, green committee, and the superintendent are in between that proverbial "rock and a hard spot." Everyone looks for a new Colconda. Few, if any, find it.

These are difficult times (they always are). How nice it would be to discover new ideas and new thoughts to deal with them. But the temptation is great to fall back on old and obvious remedies. It's easy to carry out indiscriminate cost cutting; eliminating two or three men from the crew; placing contracts with the lowest bidder; not replacing equipment; going the cheapest way possible every time possible. There is really no trick to saving this kind of money on a golf course. The trick comes about two years later in finding a way to bring the course back into condition without spending three times as much money. A New Zealand friend puts it well: "Cheap is often dear and dear is often cheap."

In our business-oriented society it has been proven there is simply no substitute for good

management. In golf course turf operations, this usually means a topnotch golf course superintendent. He is a saving, not a cost. He will save a club far more than the added salary he commands. Because of good recordkeeping, he knows costs. He saves in better management of personnel, equipment, purchases, and at the same time provides a far better-conditioned golf course for the membership. And that is probably the biggest saving of all!

Good management however, should not have its beginning and end with the golf course superintendent. In fact, most golf course maintenance costs today are the result of decisions reached (or not reached) by the past green committees. The committee is the key factor in the operation of any private golf club. It sets the direction, determines the policy, hires the superintendent, approves the budget, develops the planning, handles the complaints, communications, and follow-through for the entire operation. Unfortunately, it is usually a short-term committee; it cannot do all of these things well. Even the strongest efforts toward long range planning and economy are often lost in the minutes and dust of the committees that

follow.

But there is hope! During a recent visit to Kitsap Golf and Country Club, Bremerton, Wash., we met H. Joseph Martin, a man who loves golf, a former green committee chairman himself and a genius at organization and detail. Joe Martin knows the trials, the time and energy requirements as well as the limitations of the Green Chairman and his committee. Realizing that short-term committees (one, two or three years) are part of the by-laws of most clubs (and short-term committees unable to accomplish long term results), he set to work to improve long range turf management economies, efficiencies, and capabilities through administrative means. His story is interesting. His proposal deserves attention.

THE KITSAP PLAN

by Joe Martin

Kitsap is like many private golf clubs throughout the nation. The Board of Directors conducts the affairs of the club to within the framework of the By-laws. At Kitsap, we are celebrating our 50th Anniversary this year, and the governing body has changed many times over the past half-century. With it, committees and chairmen have also changed. Each individual is to be commended for his work, devotion to golf and the time he has given in whatever capacity.

However, these frequent changes, in addition to peaks and valleys in the financial posture of any private club, make it virtually impossible to have continuity in improvement and development of a golf course established years ago. It follows, then, that many problem areas on the course are slow to be solved, if they are solved at all. This is usually the case no matter how well intended a committee may be.

To get at the problem of management and planning, the Board of Directors at Kitsap recently authorized the establishment of a Long Range (5-10-15-year) Improvement and Development Committee, subject to approval by the stockholders, to be a separate committee within the By-laws as follows:

Duties and Responsibilities

The Long Range Committee shall be composed of nine members, with three members selected every three years by the Committee (beginning in 1976). Vacancies to be filled as they occur. Such appointees must have knowledge of golf course problems and development. The Chairman is selected by the Committee. The current Green Chairman or a member of the Board of Directors shall be an ex-officio member of the Committee.

The function of the Committee shall be planning, designing, determining cost of future



The Kitsap plan of H. Joe Martin, a program for progress.

improvements and development of the golf course.

The Committee may solicit the assistance of The Green Section of the USGA, the annual fee to be budgeted by the Board of Directors. The Committee may employ a golf course architect or an individual of similar experience and knowledge when the need is warranted. The fee shall be included in the proposed cost of the project.

During the first meeting of the Long Range Committee, it became obvious that some problem-solving procedure had to be implemented. Without it, Committee members were discussing all 18 holes at once, and each pointed out a particular problem of personal interest. Accordingly, the Committee, by hole sequence (1 thru 18) isolated each improvement and development needed on the course. This is not to say more may not be added in the future.

Each problem was assigned a serialized indexed number. For example, 1-2-4 referred to "1" for improvement; "2" designates the hole in question and "4" the numerical representation of the improvement on that hole. In this example, the Improvement relates to the 2nd Hole and turf conditions 70 to 180 yards off the tee. (Figure 1).

The same sequence applies to developments required on the course except, in this case, the first character becomes a "D" for Development. For example, D-3-1 refers to development on the 3rd Hole, Number 1 (i.e., relocation of the tee to the east). (Figure 2.) Through this procedure, an index is established and the

Committee can address discussions to any specific area of the golf course.

The Committee, armed now with an index and reference point, must prepare documentation for every one of the index numbers. A form has been developed (Figure 3) requiring essential information necessary to the 5-10-15-year Long Range Improvement and Development Program. The expense and priority placed on each item determines its place (5-10-15 years) in the program. This procedure not only has a significant advantage for the record, but more importantly, lost time, money, confusion and misunderstanding can be avoided.

Kitsap Golf & Country Club recently joined the USGA Green Section Service. During the scheduled visit of the Green Section representative, our system was put to a test. Course improvement requiring professional services were cited by index number and accompanied by a matching index form. The forms were placed in a folder for the Green Section representative to use during his visit. The Superintendent, Green Committee Chairman, and members of the Long Range Improvement and Development Committee then accompanied the Green Section representative to these specific areas. Each problem was dis-

cussed in detail, recommendations offered and recorded on the form. The visit was followed by a regular Green Section written report.

Some will say a long range program should be developed by the Green Committee and funded each year in the budget. There is nothing wrong with this approach if a golf club has the continuity of committee chairmen, committee members, board members and an annual budget to support it. However, these ideal conditions seldom apply to the average private golf club. Changes in committee personnel present a steady stream of new ideas in addition to the normal requirements of golf course maintenance. Consequently, a Long Range Improvement and Development program cannot survive a period of years necessary to complete it. The steady stream of new ideas, many of which are not supported by written professional judgement, take precedence during succeeding years. This results in maintenance inefficiency and a waste of money and talent. It is recognized that the Green Committee and Long Range Committee must have a close relationship and understanding. Any planned and funded improvement or development must ultimately be scheduled with the golf course superintendent.

INDEX	
NUMBER	IMPROVEMENT REQUIRED
I-1-1	Bare areas in back of tee
2	Tee drains
3	Clear gully in right rough
4	Black top steep part of cart path
5	Fairway drain below green
6	Add sand in bunker
7	Pull cart path to left of green is unsightly
8	Rid green of pearl wart
9	Remove stump in back of green
10	Remove rut in back of green
I-2-1	Tee needs leveling
2	Clear gully to right of tee
3	Ladies tee needs leveling
4	Turf condition 70-180 yards off tee
5	Fairway drainage 70-150 yards off tee
6	Distinction between fairway and rough
7	Clear gully above No. 18 green
8	Turf condition south and east of bunker
9	Add sand in bunker
10	Drainage in front of green
11	Bank on west of green is eroded

FIGURE 1.

I-18-1	Moles in tee area
2	Alders growth in rough
3	Erosion to right of cart path
4	Holes in fairway
5	Fairway drains
6	Turf condition to right of green
NUMBER	IMPROVEMENT REQUIRED
I-Gen-1	Temporary tees leveling
2	Fairway holes
3	Sand bunker
4	Greens
5	Temporary greens
6	Moles
NUMBER	DEVELOPMENT
D-3-1	Relocate tee to east
D-4-1	Relocate tee to east
D-6-1	Make pond into reservoir
D-10-1	Relocate tee to original location
D-10-2	Develop a practice area
D-11-1	Extend tee and fairway to south
D-11-2	Remove telephone poles
D-11-3	Install creek retaining wall
D-12-1	Extend tee 30 feet back
D-12-2	Recontour green and surrounding area

FIGURE 2.

IMPROVEMENT

Index No. 1
 Started 19
 Completed 19

HOLE # _____

IMPROVEMENT REQUIRED _____

PLAN TO IMPROVE _____

PLAN RECOMMENDED BY _____

PROFESSIONAL ARCHITECT _____ Services Required Yes _____ No _____
 ENGINEER _____ Services Required Yes _____ No _____
 _____ Services Required Yes _____ No _____

MAINTENANCE CREW CAPABILITY Yes No Partial

COST TO IMPROVE Professional Services \$ _____
 Material \$ _____
 Labor—Man Hours \$ _____
 Other \$ _____
 Estimated Total \$ _____

NECESSARY TIME TO IMPROVE _____ Weeks _____ Months _____ Years

MONTH(S) OF YEAR TO IMPROVE (Circle) Jan Feb Mar Apr May June
 Jul Aug Sept Oct Nov Dec

YEAR & PRIORITY TO IMPROVE Year 19 _____ Priority _____

HOLE CLOSED TO PLAY DURING IMPROVEMENT Yes _____ No _____ Partial _____

(Use reverse side for details or documentation)

FIGURE 3.

Other clubs are welcomed to use this procedure or a modification of it if they wish. But all areas of the golf course requiring improvement or development (no matter how insignificant) should be included in a long range improvement and development program. The sum of these will make your golf course more enjoyable to play and far more efficiently run.

In summary, the best way to move a golf maintenance program forward is to recognize the problems, put them in writing and follow through with a written *best judgment* solution. If professional services are needed, don't accept anything less. A professional judgement will be accepted by most memberships and only adds support to the Committee and Superintendent's decisions.

The Kitsap plan makes sense. It brings increased efficiency and effectiveness to long range planning. It brings support to the Superintendent in developing a sound, economical management program for tomorrow. It can save untold sums for any club!

But what about today? What about complaints?

No matter how well planned a turf management operation may be, the Green Committee will find unavoidable the day-to-day problems. Complaints from the membership represent one of the more difficult areas requiring constant attention. There are no "little complaints." The Green Committee must concern itself with making proper decisions, not necessarily popular ones.

*"You can't just go on being
a good egg. You either hatch or go bad."*

C.S. Lewis

Millennium it would be if one could anticipate all the problems and take action before they are ever registered. That, of course, is impossible. How best, then to keep the membership happy, the budget in line and the golf course in shining condition?



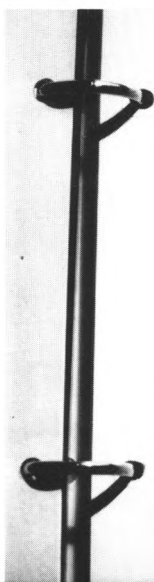
Rancho Bernardo Chairman Harry J. Schmidt.

THE RANCHO BERNADO PLAN

Harry J. Schmidt, Green Committee Chairman at the Rancho Bernardo Country Club, San Diego, Calif., has developed a most satisfying and fair solution to this age-old and often knotty problem. He has taken an old idea, added innovation and seasoning and, offers a recipe that's hard for anyone to quarrel with.

Prominently located just inside the main entrance to the club house at Rancho Bernardo stands a table holding a neat display entitled "Information—Green and Rules Committee." An attractive loose leaf book rests there and contains the latest action and decisions of the Rules and Green Committee. The display also carries a supply of "Requests or Suggestions to

An Action Sheet at Rancho Bernardo.



SEPTEMBER 1974

CASE# 6-1

PROBLEM -- HAZARDS WHILE LEAVING GREEN

LOCATION -- 6th hole, in front of green.

DISCUSSION --

There seems to be a strong tendency on the part of members to park carts near the front or the green and on the cart path to the right. This causes them to walk from the green to their carts after playing the hole in a path that is hazardous because of upcoming shots. A member suggested that while this hazard may have to be accepted on some holes because no alternate path is readily available, this is not true at the 6th.

The proposal is to ask that members park their carts to the right rear of the hole and use the back portion of the green as an exit path. The green would therefore be cleared somewhat faster and considerably safer from impatient shots that exceed in distance the hitter's expectations.

RECOMMENDATION --

The committee agrees in the merit of the suggestion. Accordingly an appropriate sign has been prepared and installed designating the preferred location for parking carts while putting. It is believed this will not require any more steps on the part of our golfers but it will add considerable to their safety.

APPROVALS --

Greens Committee 2-10-74

Completed 3-19-74

the Green Committee." (Please see Figure 4.)

Chairman Schmidt believes that if a member's complaint has any validity, it should be presented to the Green Committee in written form. Only written "Requests or Suggestions" come to the Committee's attention and every-one of them receives an answer!

If the problem is a routine one, Schmidt relays the Committee's action directly to the member by telephone.

If the problem is of major concern, the Green Committee prepares a recommendation for the Board of Directors and the Board then takes final action. If its decision is of general interest or concern to the entire membership, an "Action Sheet" is prepared and included in the loose leaf book. The "Action Sheet" may be quite detailed (if warranted), giving both pro and con on the question. Thus, Green Committee decisions affecting the membership are current, official, and readily available to every member. The Action Sheets represent the feedback on important questions. More importantly, however, they form a history and an ongoing record of decisions for the next Green Committee.

The Rancho Bernardo Green Committee is

comprised of five members, plus course Superintendent Gary Silor. It meets once monthly and always one week before the Board of Directors meeting. Chairman Schmidt reports that most of the suggestions and/or complaints originate with the Green Committee itself. "This is as it should be if the Committee is doing its job," he states. "But the written requests from the members receive our first attention. We reach a decision as soon as practicable, prepare the reply, and feed it back as soon as we can. The system has really worked well for us."

The Ultimate Benefactor

And so in this era of high costs we find more and more clubs concerning themselves with better administration of the club's business and money. In the field of turfgrass management, this means not only a dedicated and knowledgeable course superintendent but also more Green Committees and Long Range Planning and Improvement Committees willing to make an effort on behalf of their club. Committeemen willing to give sound business-like judgments in addition to their membership dues. The ultimate benefactor is the game itself.

REQUEST OR SUGGESTION TO THE GREEN COMMITTEE

Submitted by _____ Date _____

Item submitted:

Your recommendation:

Any member wishing consideration of any matter within the responsibility of the Green Committee should do so by means of this form.

Submit to any committee member or to the club office.

Received by: Green Committee: _____ Course Supt. _____

Action Notes:

FIGURE 4.

Fairway Row Planting of Tifton 419 Bermuda

by LOU OXNEVAD, Certified Superintendent, Riviera Country Club, Coral Gables, Florida

The 36-hole Biltmore Country Club of Coral Gables, Fla., was opened for play in the fall of 1926. In 1930, 18 holes were left virtually unattended until 1946 when they were re-established as Riviera Country Club.

During the years the course lay unattended, the original fairways were contaminated with numerous natural selections of undesirable bermuda grasses. Mixed throughout the fairways and roughs, most of these grasses were weak and of poor quality. This made it impossible to carry on a proper weed and fertilization program. An inadequate manual water system further hampered our progress.

The Riviera Country Club embarked on a two-year program to replant the fairways and improve the roughs. The first step was to install a completely automatic sprinkler system, which was completed by the late summer of 1973. Next, plans were made for the actual row planting. I had successfully used a three-row tobacco planter for grass planting about eight years ago. Later, I observed the automatic row-planter of Southern Turf Nurseries in operation, and felt that this method of planting would be the best to establish Tifton 419 bermudagrass stolons in existing fairways. The two types of planters under consideration were much the same, except that one machine planted two rows and the other planted four rows simultaneously.

A row-planter, for those unfamiliar with this machine, is one with a large hopper and drawn by a tractor. The overall length is approximately ten feet and the height eight feet. An operator is necessary to release the grass stolons

from the hopper. The stolons fall onto two conveyer belts that carry the grass into two back chutes. Here the planting mechanism consists of an eight-inch turf-cutting disc, followed by a toe plow which opens a furrow. The chutes release the grass stolons into the furrows and a pressure disc pushes the stolons to an adjustable depth. Four arms close the furrow and the soil is then flattened and firmed by two rollers.

The row planting at Riviera Country Club was planned for the second week of May to take advantage of the seasonal rains. Two weeks prior to this date, a slow release 3-1-2 fertilizer mixture was applied to the fairways. Thirty-six hours before the planting of each fairway, it was sprayed with paraquat, using one gallon per acre. The actual planting was begun by using rows 10 to 12 inches apart and adjusting the planting depth for the stolons from 1 to 1½ inches. This depth was considered best for the course, because the soil is a shallow covering over coral rock. Approximately 340 bushels of grass stolons were used per acre. (This exceeded the amount originally planned.)

It proved best to begin planting around the slopes of the greens and then begin the straight furrows for the fairways. Otherwise, furrows around the greens are criss-crossed at the end of the fairway rows, leaving a rougher surface than necessary. A smoother surface was further achieved by following the row-planting machine with a tractor-drawn fairway roller over all areas being planted.

The first half-hour after planting is a critical time for the young grass stolons. Water was

The row planting process is underway.



Row planter in operation.





Curved plantin on bank near a green.



Completed fairway after row planting.

A fairway two weeks after planting.



applied within this time and continually as planting proceeds. In seven to 10 days after planting, the old fairway grass began turning green again. In areas that were overly wet or heavily thatched at the time of planting, the Tifton 419 stolons were restricted and growth was slower. However, in previously bare areas and where older types of grass grew, the newly planted stolons sent out runners as far as six inches within a few weeks.

Two weeks after the row-planting had been completed, each fairway was fertilized with an 8-8-8 mixture. The planting operation was finished in 22 days with little interruption for golfers. Each day it was only necessary to have two holes closed and out of play.

Six weeks after planting, a light spiking proved beneficial. Three additional applications of ammonia sulphate were applied at the rate of 100 pounds per acre at three-week intervals.

There had been some concern about the ability of a row planting machine doing a successful job on steep slopes. There was no damage to the contours at Riviera Country Club, and I was pleased with the results.

Soil moisture is particularly significant for the operation of a row planting machine. If the soil is too wet the plow will open the furrow too wide and a smooth surface is more difficult to achieve. On the other hand, if the soil is too dry, the plow powders and scatters the existing sod, resulting also in a rough surface.

The only frustrating problem to me connected with this method of planting, was the rapid and extensive weed regrowth and a wait of four weeks before safely beginning a weed program.

If it is necessary for me to use this row-planting method again, in addition to the procedures followed I would use an application of MH 30 or a similar type of growth retardant. This would be applied two to three weeks before using paraquat. Instead of using one gallon of paraquat to the acre, I would reduce the amount to one quart per acre. This light application would just burn the exposed blades while the growth retardant would slow the greening of the old fairway grasses, consequently allowing the Tifton 419 to establish itself without excess competition.

Not only have we incorporated a new grass with row-planting, but have also aerified each fairway.

The fairways have now been planted for a period of two months. With the exception of a few small areas, the growth of the Tifton 419 combined with the old fairway grass have given us superior fairway quality. A complete coverage of Tifton 419 should be established in approximately two years.



Let's Trim the Right Way

by CARL SCHWARTZKOPF, Mid-Continent Agronomist, USGA Green Section

As the summer months come to a close, with the growth of grass slowing up somewhat, it is time to turn our thoughts to fall and winter maintenance. Since the repair of equipment is usually scheduled when the weather does not allow outside tasks to be completed, scheduling of tree trimming and pruning can be planned for the fall and warmer winter days.

WHY PRUNE?

Trees or shrubs are pruned to preserve their health and appearance, to prevent damage to golfers and the course. Pruning for health involves removing broken, dead or diseased branches and to prevent decay-producing fungi from penetrating into the healthy parts of the plant. Live branches can be removed to allow sunlight to filter through for better turfgrass growth. Branch stubs are removed to allow proper healing.

Dead, split and broken branches are a constant hazard to life and property. Low-hanging live branches should be removed to a height of 10 to 12 feet when they interfere with golfers

or with mowing under them.

HOW TO PRUNE

There is not a standard method of pruning, but certain procedures and precautions generally have been used by successful arborists. These procedures include starting pruning operations in the upper part of the tree and working down. This helps to shape the tree properly and saves time in clearing the tree of pruned branches that become lodged in the lower branches as they fall. All dead, broken, diseased and insect-infested branches should be removed. Small branches that may prove undesirable within a few years should also be removed. Clean cuts should be made as nearly flush as possible next to the branch that is to remain. Dead branches should be cut back to healthy wood, so the live tissue surrounding the cut can heal.

All final cuts should be made as close as possible to the remaining live portion of the tree. Stubs should never be left, since proper healing is inhibited, thereby providing an

environment that may promote wood decay. Theoretically, all wounds, regardless of size, should be painted with a dressing. However, in actual practice wounds over two inches in diameter are painted. One should bear in mind that decay may readily develop in smaller untreated wounds, especially in trees that have a low vigor with a slow healing process.

WHEN TO PRUNE?

Although there are advantages and disadvantages in pruning during certain seasons, trees may be pruned at any time of the year. The timing is usually controlled by practical considerations. Trees can be pruned more easily to the desired shape when they are in foliage, and it is easier to see the weakened, diseased or dead branches.

Since most rapid healing occurs on wounds in early spring, it can be an ideal time for pruning. However, some trees, such as maples and birches, bleed so profusely when cut in the spring that it is better to delay pruning until summer or fall, when the sap does not flow as freely. Therefore, many trees are usually pruned during the winter to distribute tree maintenance work more evenly over the year.

REMOVING LARGE BRANCHES

The tree will suffer considerable damage if only a single pruning cut is made in a large branch, as shown in figure 1:

As the cut deepens, the remaining wood will become too weak to support the weight of the limb, and much of the bark below will be ripped off. The proper method to use in removing a large branch is shown in figure 2. About a foot beyond the proposed final cut, a preliminary undercut is made until the saw blade binds (cut A). On the upper side of the branch an inch or two beyond the first cut, a



FIGURE 1.



Decay may develop in untreated tree wounds.

second cut is made to sever the branch (cut B). The short stub remaining can be removed by making the final cut (cut C) as nearly flush with the main branch as possible. The stub should be held in by the operator's free hand or a rope to prevent tearing the bark. When an entire branch is small enough to be held firmly in place by ropes or by hand, the first and second cuts (cuts A and B) may be omitted.

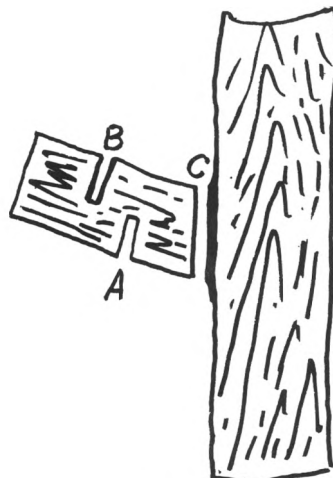


FIGURE 2.

Removing large limbs from trees requires additional precaution. In many instances, large branches must be lowered to the ground in pieces or whole to avoid damage to shrubs, turf and property below. This can be accomplished with the use of two or more heavy ropes that lower and guide the branches in their descent.

TREATMENT OF WOUNDS

A major reason for decay and death of trees can be traced to neglected wounds made several years before. The bark of trees, like our skin, serves to protect the cells and tissue below. Once this protective cover is broken, the area below is subject to infection by disease, insects and other parasites.

Wounds made by a tree owner's saw in removing a dead, broken or unwanted branch, by a skidding automobile, or even by a mischievous boy's ax should be treated.

DRESSINGS

To protect the tree from the scar or wound of pruning, it is helpful and strongly suggested that a wound dressing be applied. An ideal wound dressing would disinfect the area treated, prevent entrance of disease organisms and insects, and stimulate callus formation. It would also be easily applied, sufficiently porous to allow excess moisture to evaporate from the wound underneath, and not crack upon drying or weathering.

Unfortunately, no single dressing has yet been developed that meets all of these requirements. However, many of the following items are commonly used: orange shellac, asphaltum paint, creosote paint, grafting wax, house paint and many easily available commercial tree paints.

Regardless of the wound dressing used, optimum results are obtained when the dressed surfaces are inspected periodically and recoated once or twice a year. This is important when the dressing blisters, cracks or peels. When preparing old wounds for recoating, it is best to clean the surface with a stiff wire brush to remove the blisters and loose flakes.

SAFETY HINTS FOR PRUNERS

1. Determine the general condition of the tree. Greater precautions should be taken when working in an old, weak tree, as compared to a young tree that is sound.
2. Examine pruning equipment often for safety and efficiency.
3. Know the type wood in the tree. Extra precautions are needed in weak-wooded trees, such as poplars, silver maples, willows and tulip trees than are required in pruning trees such as elms, oaks, hickories and plane trees, which have stronger wood.
4. Danger is greatest when branches are wet and when temperatures are low.
5. Peeling bark and fungus growth indicates dead and dying branches. Limbs exhibiting these symptoms should not be used for support.
6. When electric wires run through a tree, remember the danger of electric shock is increased when the tree is wet.
7. Do not allow tools to come in contact with wires, even though the wires are supposed to be insulated.
8. Always have a safety rope properly attached to yourself and the tree.

A proper dressing stimulates callus formation.



Sand for Golf Courses

by THE USGA GREEN SECTION STAFF

Of all the materials necessary for the construction and maintenance of golf courses, sand—common sand—is among the most important. Great quantities are needed for bunkers and in topsoil mixtures both for the construction of greens and for later topdressing.

Sand is among the most abundant materials on earth, and it can be found in differing

textures and colors, from the coarse white sand of coral atolls of the Pacific to the fine pink sand of Bermuda's beaches. Not every sand can be used for every purpose on golf courses, however. They must be defined and graded. Sands for topsoil mixtures have been precisely defined, while, surprisingly, sands for bunkers have not. More surprisingly, both are so close in

Sand of the recommended particle size is at left; common granulated sugar, the kind you find on any table, is on the right.



particle size designation that they could be used interchangeably. Research at Texas A&M University and at Mississippi State University resulted in the USGA Green Section recommendation for sand particle sizes ranging ideally between 0.25 millimeter and 1.0 millimeter in topsoil mixture for greens.

Sand in this particle size range also is suitable for bunkers. Sands in the range will not remain on top of the grass, but will seep into the soil. Everyone has seen a spray of sand lying on the green after an explosion shot from a bunker. Particles larger than one millimeter tend to remain on the putting surface, while sand particles in the recommended range permeate the turf and, therefore, cause no problems in mowing operations. Secondly, players will not have to remove pebbles from their line, and therefore, putting should take less time.

Sand for bunkers preferably should be light in color, or perhaps even white, but color is not so important in soil mixtures. The specifications table below is universally accepted by commercial sand firms throughout the nation.

At present, anyone can go to a sand dealer and order as much brick, mason or concrete sand as he wants. Isn't it reasonable to expect, therefore, that sand companies should also add a golf sand to their stockpile, one that meets the specifications described herein?

The recommended range of sand particle size for bunkers best suits both requirements: that is, all sand should go through a 16-mesh screen and be retained on a 60 mesh screen. Ideally, the major portion of the sand, 75% at minimum, should be in the 0.25 to 0.50 millimeter range (medium sand). Silica sands are preferred, round rather than angular, if available.

The information presented here is the best judgement of the entire USGA Green Section Staff after study of research available and practical findings as a result of the Turfgrass Service Program. It is edited and reported by Alexander M. Radko, National Research Director. Staff members are William H. Bengueyfield, William G. Buchanan, Holman M. Griffin, James B. Moncrief, F. Lee Record, Carl Schwartzkopf, and Stanley J. Zontek.

SAND PARTICLE SIZE CLASSIFICATION TABLE

*ASTM		Sieve Opening			
Mesh	Millimeter		Inches		
4	4.76		0.187		
5	4.00		0.157		
6	3.36		0.132		
7	2.83		0.111		
8	2.38		0.0937		
9	2.00		0.0787		
10	1.68		0.0661		
12	1.41		0.0555		
14	1.19		0.0469		
16	1.00		0.0394		
20	.84		0.0331		
24	.71		0.0278		
28	.59		0.0234		
32	.50		0.0197		
35	.42		0.0165		
42	.35		0.0139		
48	.30		0.0117		
60	.25		0.0098		
65	.21		0.0083		
80	.18		0.0070		
100	.15		0.0059		
115	.13		0.0049		
150	.11		0.0041		
170	.09		0.0035		
200	.07		0.0029		
250	.06		0.0025		
270	.05		0.0021		
325	.04		0.0017		

Range
For
Bunker
Use

Range
For
Soil
Mixes

COARSE
↓
MEDIUM
↓
FINE

IDEALLY—
MINIMUM
OF 75%
MEDIUM
SAND

TURF TWISTERS

SEEING CIRCLES

Question: Recently our club built several greens, using sand and peat. Now we see many circles on the greens caused by fairy ring. Where did it come from and what can be done about it? (Indiana)

Answer: Fairy ring is not a turfgrass disease, but is caused by Basidiomycete fungi that live on dead organic matter in the soil. The spores have been in the organic matter and grew when the environment became favorable. Heavy thatch is also an excellent medium for fairy ring development. Occasionally, during wet periods, mushrooms are found about this ring of active growth. Most damage occurs during stress periods when the fungus removes most of the water from the soil and the grasses suffer from drought. Since the soil is extremely difficult to moisten at this time, holes must be punched around the ring and the area then flooded with water. This practice restores the grass, but doesn't kill the fungus. Only soil sterilization will do that. Some individuals report that wetting agents have helped to improve water penetration.

ON THE LIP OF BUNKERS

Question: What grass do you recommend for the bunker "lip"?

Answer: There are several grasses that are suitable. These include bentgrass, Kentucky bluegrasses, zoysias, creeping red fescue and tall fescue. Tall fescue makes an awesome "lip." It does not weaken when subjected to drought conditions or sand dressings due to accumulative explosion shots. Another "lip" plant, that you might consider, one that is a weed elsewhere but is especially suited to these conditions is Yarrow (*Achillea millefolium*). It makes an attractive bunker lip since it forms a dense mat when mowed, it branches and roots at many of the joints and it has a heavy tough root system.

THROUGH COLORED GLASSES

Question: We have noted when we renovate in fall that even when our "catch" of seeded grasses is poor and a new crop of *Poa annua* results, that our new *Poa annua* seems to survive better during any adversity the following summer. Am I looking at my world through "Poa's colored glasses," or is there substance to this observation? (New Jersey)

Answer: Your observations are keen and correct. We too have observed where thorough renovation is performed, the new *Poa annua* performs better than old, tired and worn *Poa annua*. There is something about seedling vigor, new growth, lack of thatch, etc., that together with soil cultivation improves chances for the new *Poa annua* to better withstand adversity during its first year. This doesn't insure that your *Poa annua* will absolutely survive any given summer, but it may help; and any *Poa* summer help is welcome, for those who wish to perpetuate *Poa annua*.