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UNITED STATES GOLF ASSOCIATION GREEN SECTION

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Velvet Bent (*Agrostis canina*)

By Major R. Avery Jones, Baltusrol Golf Club

Velvet bent makes the finest and the most beautiful turf of any of the northern grasses.

On nearly all old seeded greens, circular patches of this fine turf, varying in diameter from one to four feet can be found. It is strange that the fact that velvet bent produces such fine turf has been overlooked so generally. While some attempts have been made to produce pure velvet bent seed, and seedsmen have advertised their mixed bent as having a large percentage of velvet bent seed, there appears to have been no real effort made to produce pure velvet bent greens.

Three years ago a turf garden was established at Baltusrol Golf Club. The garden contained, in addition to creeping bent planted in beds and rows, twelve beds of velvet bent planted by the stolon method, and three beds consisting of velvet bent patches of divot size—a total area of 5,000 square feet.

The velvet bent stolons were obtained on the golf course early in November. They were hand-picked from edges of greens and the rough. No doubt there were dozens of different strains varying in color from a light green to dark-blue green.

There being no data as to the quantity of velvet bent stolons required for a given area, each bed was planted with a different quantity, varying from a light covering to three times the quantity of creeping bent stolons recommended by the Greens Section.

The divot planted was as follows: The divots were small circular patches about four inches in diameter. They were placed on prepared ground about four inches apart. Screened soil was then applied in sufficient quantity to fill in between the patches.

The nursery planting was finished about November 15, and with the exception of topdressing and watering, received no further attention that fall.

Due to the very late planting there was very little growth, but sufficient to indicate that both the stolons and divots were established. In the following spring, the creeping bent grew much more rapidly than the velvet bent. The creeping bent beds were well covered in May, and were mown every day, but the velvet bent grew much more slowly. However, during the summer the velvet bent began to grow rapidly, and by July every bed was a solid mat. The velvet bent had produced in the same period, far better putting turf and a much more beautiful turf, than had the creeping bent stolons. Despite the radical difference in planting and quantity of stolons used, there was very little variation in the quantity of turf.

During the month of September, 1925, five thousand square feet of the velvet bent turf, and three thousand square feet of creeping bent sod—the entire nursery—was cut, and used to sod the new ninth green of Baltusrol's Upper Course. The approach and back of the green received the creeping bent.

The turf was a little too young for moving, but it soon became established, and is now in fine condition, although, not yet as dense as the mats to be found in the older seeded greens. It would seem that it takes three to four years for the dense mats of turf to form.

In the treatment of velvet bent in the nursery, it was found that it did not require, and in fact would not stand, nearly as much topdressing as creeping bent, and the quantity of ammonium sulfate that can be applied to it with safety is also less.

Little brown-patch has attacked the velvet bent green, but not to any greater extent than other greens. There was no loss of turf.

As a putting green grass, velvet bent has the following advantages:

Excellent color, fine texture, and a dense turf. Weeds made little headway in well established velvet bent. Less topdressing is needed. The growth of the grass is less rapid than creeping bent, and mowing is much easier. Velvet bent appears to require less water than does creeping bent. There are several greens at Baltusrol in which velvet bent amounts to as high as 80 percent of the turf; yet in those greens little brown-patch gives the least trouble.

Whilst one can not draw conclusions after so short an experiment, the writer has proved to his own satisfaction the following:

1. Velvet bent turf can be produced from stolons in the state of New Jersey.
2. Topdressing must be very light. Application of sulfate of ammonium and similar fertilizers must not exceed two-thirds the quantity normally applied to creeping bent.
3. Surface drainage is imperative. Velvet bent winter kills much more easily than does creeping bent.
4. When once established, velvet bent does not send out runners on the surface as does creeping bent.

Metropolitan Bent at Marble Hall

By H. C. Toomey

Marble Hall, Philadelphia's only "Pay-as-you-play" course, was designed and laid out during the summer of 1924, but the planting did not begin until the last week in September, was held up by heavy rains, and was not finished until the first week of November.

All the tees, fairways, and greens, with the exception of three holes, were sown with the Metropolitan strain of creeping bent by the vegetative process. The soil on the greater part of the course was heavy clay, more suitable for making bricks than for growing grass.

No manure or humus was used on the fairways, but 400 pounds of tankage to the acre was applied. Very little growth was noticed during that fall.

The following spring was dry and hot with very high winds. A water system had been installed when the course was built, and 300

gallons of water per minute was sprayed on the fairways during several torrid spells in April and May. As a natural result, because of the intensity of the sun's rays and high winds, the ground was baked hard, and cracks as wide as an inch appeared in many places.

In building the Marble Hall links it was decided to give the Metropolitan strain of bent as severe a test as possible to see if it would produce the results claimed for it without being coddled, so to speak. That was why no manure was applied on the fairways and why the planting was carried on the previous fall even during bad weather, only being interrupted for a part of October when conditions were impossible because of continuous rain.

The peculiar weather of the spring of 1925 capped the climax of this test, and yet the bent made headway in the summer of 1925 without the use of fertilizers and with only cutting to help it along.

In the middle of June, 1925, the course was opened and has been in use steadily ever since, save for several months each winter. Many of the players were novices at the game of golf and would have utterly ruined fairways of ordinary grass.

In spite of all these handicaps, the bent continued to thicken and reach out to cover bare spots during the remainder of 1925, and during the cold and unseasonable spring and summer of 1926. In fact, by the fall of 1926 the bent had healed practically all the bare spots on fairways and tees, while the greens were in remarkably fine condition.

This spring the fairways were among the best in Philadelphia district, while the greens were in perfect shape. There is hardly a place on any of the fairways where a player can complain of the lie.

These Marble Hall fairways have been cut regularly, and in consequence the turf is firm and springy and there is no trace of the fluffy condition that has often cropped up at courses where the grass has been permitted to grow long and not been mowed consistently.

Three of the fairways were laid out over old pasture land with thick turf of good bluegrass. These fairways were not plowed up and sown with bent, but were left as they were except that they were treated with topdressing and fertilizer. There is a striking difference today between the bluegrass turf and the new bent turf on the other fairways, very much in favor of the latter.

It will not be necessary again to put this strain of bent to such a severe test. Further experiments have demonstrated that if 10 cubic yards of manure per acre had been disced in the fairways before the bent was planted the grass would have come through in much shorter time and the heavy clay soil would not have baked and cracked.

If the soil had been light and fairly good it would not have been necessary to use any humus or manure.

The cost would have been prohibitive to plant these fairways by hand, and so a special set of machinery was devised by the engineers who built the course, and with its aid three men did the work of 50.

Because it is a semipublic course, Marble Hall is crowded during the summer months, especially on Saturdays, Sundays, and holidays, and, naturally enough, a great many divots are taken up in the

fairways and on the tees. But during the growing season the bent heals itself with truly amazing swiftness.

The tiny runners reach out from every side of the hole in the turf until they meet each other, and in no time it seems the gap has disappeared. This ability to swiftly hide its own wounds is one of the most valuable qualities of the creeping bent grass.

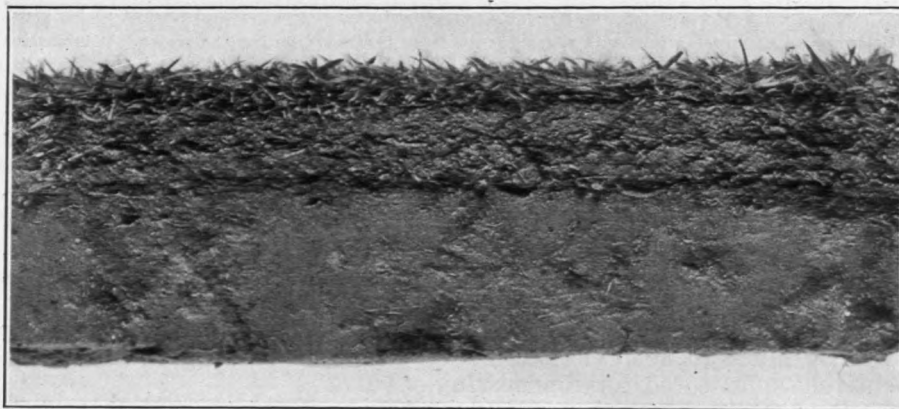
The Putting Surface

By George Cunningham

All good greens have one quality in common, a true "putting surface." Fine greens may be composed of mixed bent, creeping bent, velvet bent, fescue, redtop, Bermuda grass, bluegrass, or various combinations of grasses and other plants such as clover and yarrow and still be excellent if the ball runs true. That the ball shall run truly is always the most important requirement.

A turf of perfectly uniform texture often seems to the inexperienced greenkeeper to have a true "putting surface" when it may in reality have nothing of the kind. This error has led directly to much criticism of creeping bent greens.

Good putting is impossible on an insufficiently topdressed creeping bent green, but as such greens generally present an attractive appearance because of their uniform texture and color, many players have condemned the turf whereas the real cause of trouble was because improper maintenance methods were used.



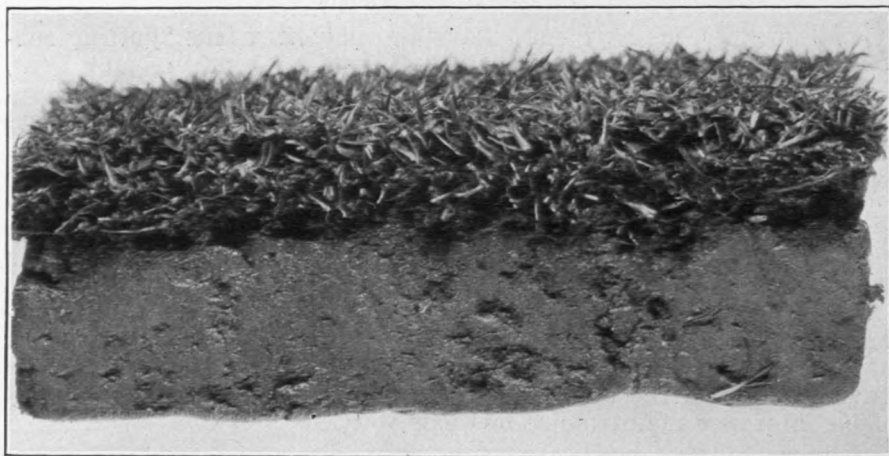
Cross section of properly topdressed creeping bent turf. Note that the surfaces of the soil and turf combine to form the real "putting surface."

A putting green may be compared to a billiard table, the ball depending on the trueness of the slate for its accuracy and on the texture of the cloth for its speed. The slate, or soil surface, must be true or good putting becomes a matter of luck instead of skill, the fact that the cloth, or turf, may be thin is of less importance, but if the turf is so long and matted that the underlying slate, or soil surface, can no longer directly guide the rolling ball the game becomes a farce. On many creeping bent greens the latter condition exists simply because the importance of the true "putting surface" is either not recognized or is thought to depend on the surface of the turf it-

self. Both the underlying soil surface and the surface of the turf combine to form the "putting surface."

Greens of Bermuda grass or creeping bent require frequent topdressing. Greens of mixed bent require somewhat less, and to topdress velvet bent greens as heavily as creeping bent must be topdressed would seriously injure if not entirely smother the turf.

The question of relatively fast or slow greens need not be considered except to the extent of saying that if the turf becomes so long as to check the ball abruptly good putting is impossible.



Cross section of creeping bent turf which has not been topdressed during the season. It is obvious that contact with the soil has been lost and that no real "putting surface" exists.

Newly planted greens require more frequent and heavier topdressings than greens in their second or third year, not because of the need of fertilization but to true up the soil surface. Old greens are generally good ones because of their true soil surface rather than because of the excellence of their turf. Small spots in an otherwise true green can sometimes be brought into proper condition with not more than a pail of topdressing. If a well hit ball bounces along its path there is still work to be done on the soil surface.

On sandy soils the problem is simpler for an occasional rolling will do much to keep the soil surface true but rolling can never be entirely substituted for topdressing.

On nearly every other question of greens maintenance there is a chance for honest difference of opinion, but everywhere the "putting surface" can be made a true one and unless it is true there is just cause for criticism.

Do not forget that the soil surface and turf surface combine to form the "putting surface," and that the soil surface is the more important of the two factors.

"Assuming that proper ground has been selected, the man who can build a golf course and get his results with the least number of artificial hazards and with a minimum of interference with the natural topography and atmosphere of the land, is on safe ground and his work will stand the test of time."

The A B C of Turf Culture

Lime in Sand, Soil or Water Often Overcomes Acidic Properties of Sulfate of Ammonia—By O. J. Noer

Clovers are lime-loving plants and do not grow well on acid soils. This fact makes it possible to rid greens of clover, because the bent grasses appear to thrive on soils sufficiently acid to discourage clover. Acid producing fertilizers, such as sulfate of ammonia, are commonly used on greens to create conditions unfavorable to clover and weeds. Yet in many instances this treatment has not been effective.

Soils Become Acid Slowly

Soil acidity develops slowly. Soils have a remarkable power of resisting change and hence acidity is slow in asserting itself. Loam and clay soils possess this power of resistance to a marked degree and develop acidity more slowly than sandy soils. One application of sulfate of ammonia is not sufficient to create the conditions desired, and it is only when repeated applications are made that a neutral alkaline soil develops the desired acidity.

Lime Often Added to Greens in Sand, Soil or Water

In many instances, particularly in limestone regions, the sand and soil used in topdressing mixtures contain sufficient lime carbonate to entirely overcome the acid producing power of the small amount of sulfate of ammonia used. The local water supply in such regions may contain sufficient lime to produce the same result. Since it is not possible to increase the rate of application of sulfate of ammonia without danger of injuring the turf, care must be used in selecting sand and soil for topdressing use if acid soils are desired.

Last fall, casual inspection of a sand used in topdressing mixtures, showed the presence of lime rock particles. This sand came from a pit which supplies large quantities of sand to the Chicago district. Upon analysis it was found to contain 20 percent lime carbonate. Each time a green received 500 pounds of this sand in the topdressing mixture it was equivalent to applying 100 pounds of crushed agricultural limestone. The green chairman and greenkeeper on this particular course would commit murder rather than scatter a 100-pound bag of crushed limestone on the green. Yet the greens had received repeated applications of lime unbeknown to either of them. The same condition obtains on many courses in the Chicago district and undoubtedly in other districts also. Soils in limestone sections often contain 2-5 percent lime carbonate and here again the greens receive a generous dose of lime whenever such soil is used in the topdressing. If 2,000 to 3,000 pounds of this soil is applied to a green it receives about 100 pounds of lime carbonate which is capable of counteracting soil acids. At least 65 pounds of sulfate of ammonia must be applied for each 100 pounds of lime carbonate simply to overcome the alkaline properties of the lime. Additional sulfate must be applied to create acidity. Such heavy applications are never made, and as a result greens do not become acid even though sulfate of ammonia is used repeatedly. If acidity is desired any sand or soil used in topdressing mixtures must be tested for lime carbonate.

In limestone regions it is often difficult to find local supplies of sand free from objectionable lime. If acid soils are desired it may

be necessary to obtain sand from other areas. Acid soils, however, are often encountered even in limestone areas.

Rough Test for Lime in Sand and Soil

The presence of lime carbonate in sand or soil can be easily detected. Whenever an acid is poured onto lime carbonate a gas called carbon dioxide is liberated. The liquid froths and the gas escapes into the air. To test a sample of sand or soil procure some muriatic acid from a nearby drug store and pour it on the suspected material. If lime carbonate is present carbon dioxide will be liberated and escape. The amount of gas liberated serves as a rough measure of the amount of lime carbonate present. Often a few tiny bubbles emerge at the surface even though the sand or soil does not contain lime carbonate. This is escaping air which was trapped by the liquid. In case of doubt hold the dish to the ear. If a hissing sound is audible the material undoubtedly contains some lime carbonate.

Accurate determinations of the amount of lime carbonate present can be obtained by submitting samples to a chemist, or the State Agricultural college. Most state colleges test samples without charge. The samples should be carefully labelled and forwarded in good containers, together with a precise statement of what is wanted.

Very little can be done with water supplies containing lime, so far as removal of the objectionable lime carbonate is concerned. No more water should be used than is absolutely required by the turf. Larger amounts simply increase the quantity of lime carbonate in the soil, and make the development of acidity more difficult.

(Reprinted from the National Greenkeeper, May, 1927.)

No hazard should ever be created when there is the slightest doubt as to its real necessity, except perhaps a small one for psychological effect.

Some U. S. Golf Association Decisions on the Rules of Golf

Kindly give me your ruling on the following play. It is "A's" honor. He drives his first ball out of bounds and walks off the tee. "B" refuses to drive until "A" plays his second shot. Is "B" correct according to rule? Is it a courtesy of the game however for "B" to play before "A" makes his second shot?

Decision.—"B's" contention is not correct; the honor man has made a stroke—see definition 13—his ball is in play and it is up to the opponent to put his ball in play; see Rule 2, Section I.

A and B are competing in an eighteen-hole, medal-play tournament; they have one caddie, carrying double. A drives a ball which lodges near a tree, a low branch of the tree interfering with the free swing of his club. B and the caddie grasp the branch, holding it entirely clear until A has completed his shot. The question has arisen: Was B disqualified for assisting his opponent, also, was A also disqualified for permitting his caddie to assist?

Decision.—The player is penalized two strokes under Rule 14, Special Rules for Stroke Competition. The competitor is not affected. The competitor incurs no penalty under Rule 2, special rules

for match play competitions, because those particular rules *do not* apply to medal play.

A player's ball from the tee went into the rough and lodged under some large growing leaves. In taking his stance the ball was not visible, so the player spread several leaves so that the ball could be seen. Nothing growing was broken, nor was the ball moved nor the lie improved. Would like to know if this is permitted in the rules.

Decision.—Rule 15 covers this point. It states specifically that the player is not entitled to bend or break fixed or growing things in playing the actual stroke after he has taken his stance. In this case, the player violated Rule 15 and the penalty would be the loss of the hole in Match Play and two strokes in Medal Competition. The fact that he found his ball is sufficient proof that he knew its location but he is not entitled to bend the growing leaves back to get a better view of the ball.

The Old Flatbush Golf Club

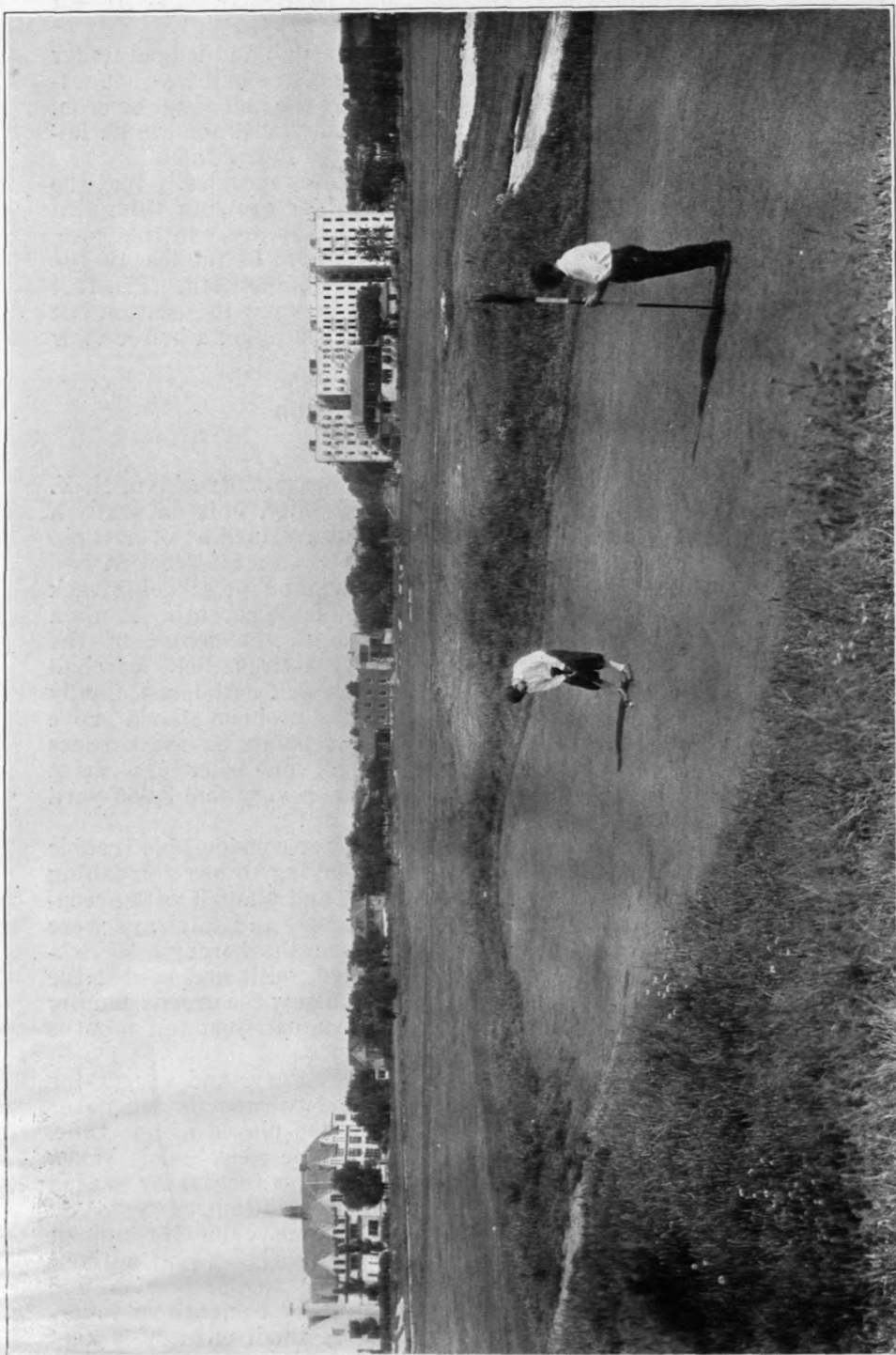
By Maurice J. McCarthy

The Old Flatbush Golf Club is built in the heart of Brooklyn, N. Y. With two million people in the immediate vicinity, it is naturally a novel situation. It comprises 53 acres of land, valued at over three million dollars. One of the tees (fifth) is built on a lot between two large apartments and is worth \$20,000. A large public school is back of the fifth green and a church is on the side of the seventh. A main thoroughfare (Bedford Avenue) runs through the center of the course. The land had been used for years as a circus field, baseball lots, dumping ground, etc. The owner, being a golf enthusiast, finally decided to have a course constructed unless the problem should prove too difficult. Several streets end at irregular points on the borders of the land, and it required some strategy to get nine holes in, without crossing these or Bedford Avenue. However, a very fine 3,065-yard course was finally designed.

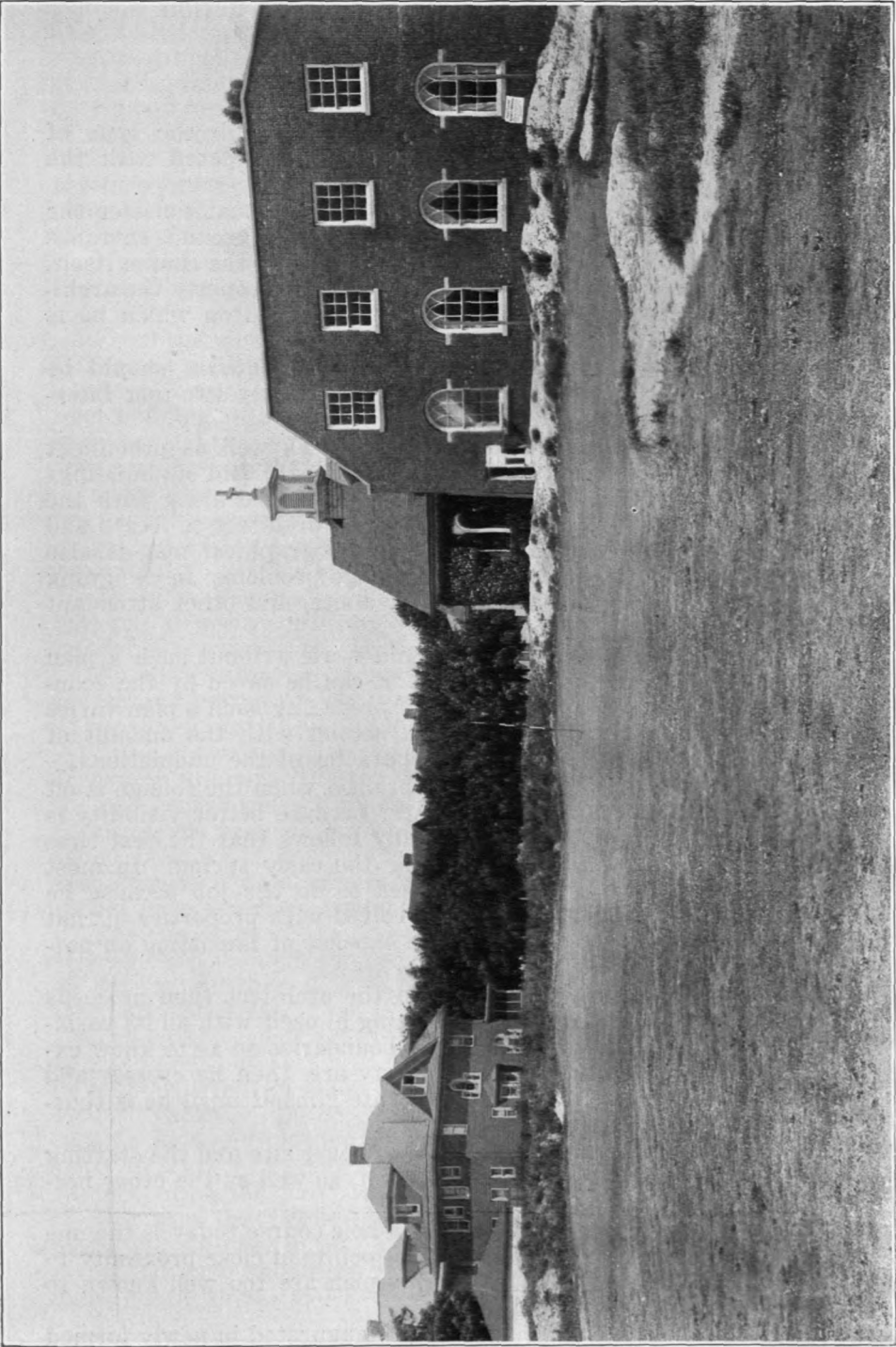
Work was started on October 1, 1924. After considerable trouble with the hard ground (more like cement), having to use a crushing machine to break it up, the greens were built and planted with creeping bent before the first of November. The tees and fairways were constructed and seeded before the end of the month, thereby establishing something of a record in having designed, built and seeded the course within two months. The spring of 1925 saw the greens coming along splendidly, and play was started in August, just ten months after ground was broken.

The creeping bent has proved very satisfactory, and except for three months last winter, the course was used to capacity whenever the weather did not interfere. As many as 106 played at one time, and round after round has been the same on fine week-ends. When the course was closed last December, despite the very rainy season and hard playing, the greens were in excellent condition.

A number of the members belong to various clubs throughout the Metropolitan District but live in the neighborhood, and without exception they say our greens are as fine as any in this section, and it is indeed a source of satisfaction to know they compare so favorably with other courses many years older. A small nursery is kept so as to always be ready for any damage which may arise at any time.



First green, Old Flatbush Golf Club. This green has been rebuilt since the photograph was taken.



Seventh green, Old Flatbush Golf Club.

Golf Course Architecture and Construction

Designing the Course. Part 1.

By William S. Flynn

When the architect has discussed with the club the type of course required he is then free to proceed unhampered with the layout.

In addition to the designing of the course he must consider the question of club house site, parking area, practice ground, entrance roads, etc., because all these should coordinate with the course itself.

In order to get the best possible layout on any property the architect must have a topographical plan of the ground on which he is working.

In gently undulating or hilly country the contours should be shown at five-foot intervals while in flatter country two-foot intervals are generally better.

All woodland should be shown accurately as well as prominent trees in the open. Streams, fence lines, stone walls and old buildings should also be plotted. With these details indicated along with the contours it is a much simpler matter for the architect to locate and familiarize himself with the ground. A topographical map is also of inestimable value in determining drainage problems, in designing the water system, locating the club house site, and other attendant facilities.

No club building a golf course should work without such a plan for in the long run the original cost of it can be saved by the economies effected from its use. The cost of preparing such a plan varies first with the acreage to be surveyed, second with the amount of woodland thereon and third with the character of the undulations.

The best and cheapest results are obtained when the foliage is off the trees, particularly in wooded country because better visibility is to be had for the surveyors. It naturally follows that the best time for surveying is either in the winter or the early spring. In most cases a local surveyor is better qualified to do the job because he should be more familiar with details involved with properties in that particular section as well as saving the expense of importing an out-of-town corps.

Armed with this topographical plan the architect then proceeds to make a study of the ground familiarizing himself with all its variations. First of all he follows along the boundaries so as to know exactly what the limitations of the property are, then he crosses and recrosses, stopping here and there to locate himself until he is thoroughly familiar with the ground.

Following this he settles upon the club house site and the starting and finishing points of the course around it, as well as the other necessary facilities.

The most satisfactory layout in an 18-hole course today is the one which has two starting and two finishing points in close proximity to the club house. The advantages of this plan are too well known to make it necessary to go into details.

A popular plan which is being widely inaugurated in newly formed clubs is to have three nine-hole loops radiating from the club house.

While a course of this kind will not accommodate as many players as a 36-hole course, yet, it is capable of taking care of the play of most metropolitan clubs on busy days and gives a varied interchange of holes. In fact, it is possible to play six distinct 18-hole courses by changing the sequence of the various nines.

The character and quality of the course should naturally come first but it sometimes happens that a club has selected a property partly because a fine house was on the ground and could be readily adapted to the club needs. In a case of this kind the starting point of the course becomes fixed.

When there is no existing house to be considered the architect is then in a better position to work out what he thinks is best as regards both course and club house.

From the viewpoint of expense it is better to locate the club house as near as possible to a boundary of the property which abutts on a public highway. This will then eliminate the necessity of expensive road building, the parking space can be laid out between the public highway and the club house and the highway can be used as an overflow parking space whenever required.

In designing the parking space it is well to remember that approximately 200 cars can be fitted into an acre and the number of cars to be parked and the area required for parking them can be figured accordingly.

The club house should be set far enough back from the public highway to secure privacy, but on the other hand this can be taken care of very readily by planting quick-growing trees and shrubs.

An ideal situation exists when such a spot overlooks the golf course and permits visibility of a large portion of the links as well as providing starting and finishing points as outlined above.

Often, however, in order to get the best out of a property it is necessary to pick a site for the club house and the starting point of the golf course well within the property. This is to be avoided whenever possible because it means expensive road construction and the added nuisance of having a roadway running through the golf course even though it be a private one. The beauty of the view to be had should have a certain amount of bearing on the club house site also.

The character of the topography in the vicinity must also be considered for it is much simpler to build tennis courts and parking areas on flat ground than it is to do the same work where the slopes are steep and irregular.

The practice putting green and the practice driving area should receive careful attention and the present-day club should by no means be without either of these. A practice hole with tees set at say 150-190-230 yards should be given consideration in the complete plan because a hole of this kind gives the members an opportunity to play shots to a green without interfering with the use of the course.

In locating the club house on a hill overlooking the course it is well to remember that while the get-away is easy the return both at the ninth and eighteenth may possibly be severe from a climbing standpoint and care should be taken in selecting an eminence that provides gentle slopes at least for the return holes.

When the architect has determined on the club house site and his starting and finishing points for the golf course he then proceeds to find the holes for the course.

While the procedure of all architects is not necessarily similar, yet, they all work to the same end and the following is purely the method of one individual.

The most important point in designing golf holes is to select proper green sites. The first condition in selecting a green site is its adaptability to the game on a particular type of hole. The second is the question of the cost of constructing the green on any particular site. The third is the beauty to be had both in the background and vistas.

The finest layout in the world may lack interest if the surroundings are unpleasant while the mediocre course appeals a great deal to the majority when the backgrounds and vistas are well thought out.

It quite frequently happens that the architect will select perhaps 30 or 40 different green sites on a property when his ultimate job is to secure only 18. This is done to exhaust all the possibilities of securing good holes. It often occurs that an architect lays out perhaps three different courses on paper before he definitely decides which, in his estimation, is best.

Contrary to the way the course is played, that is from tee to green, the architect selects his greens first and then works backward to his tees radiating in all directions from the green until he eventually secures what he is after.

The principal thought in designing a course is to produce 18 interesting holes with variety of play. A course which has variety of play and character in its natural state can readily be made even more interesting by the installation of a limited number of man-made hazards.

When the architect selects a suitable spot for a green site he marks it on the contour plan which he always carries in the field. All the while he is making notes on the topographical map and in his notebook as to the character of the ground, drainage, size of trees, and all sorts of points that will enter into the cost of construction.

When he has made a complete study of the ground and exhausted all the possibilities of green locations, etc., he takes his marked plan back to his drafting room and then with his notes ties in the various green sites.

During the tying in process the architect always has in mind the question of the sequence of the various types taking care not to have holes of similar length and character coming too closely together. The most interesting course is one where the lengths and types of holes are broken up, where two or three drive and pitch holes or any other type for that matter do not follow each other.

Perhaps the majority of players enjoy the one shot holes on any course better than the longer ones and the architect should be careful to get distinctive short holes of the proper length.

The principal thought in mind is to fit the best possible holes to the ground and while the custom is to have four short holes there is no reason why this number should not be reduced to three or increased to five if conditions warrant it.

The question as to the number of the various types of two and three shot holes for a course is one that has created a great deal of discussion in the past and this will continue as long as the game is played, but more of this later.

Unlike most other games golf has no definitely prescribed area over which the game shall be played. While in the past 10 years or

more the yardage held up as being suitable for a "championship" course ranged between 6,000 to 6,500 yards, this year's open championship was decided on a course approximately 7,000 yards long. But all courses can not be "championship" courses, that is, links where championships are decided, for they would be too expensive for the average club.

It should be the aim of the architect to lay out his course in such a way as to get the proper length holes at the proper places.

Actual yardage, however, is not the determining factor in this or that type of hole for a 430-yard hole down hill may very easily be a drive and mashie niblic while a hole reversed on similar ground might be two full wood shots.

Again the question of the ball has a great bearing on what type a certain length hole will be. Time was, and not so many years ago, when a hole 400 yards long on average ground was a good two-shot hole for the star players; now, the same hole is perhaps a drive and spade for the better class golfers.

In view of this the architect of today plans his full two-shot holes from 440 to 500 yards, depending on the character of the land and if the distance to be obtained with the ball continues to increase it will be necessary to increase the length of all holes on golf courses accordingly if the same standards of play are to be maintained.

All architects will be a lot more comfortable when the powers that be in golf finally solve the ball problem. A great deal of experimentation is now going on and it is to be hoped that before long a solution will be found to control the distance of the elusive pill.

If, as in the past, the distance to be gotten with the ball continues to increase, it will be necessary to go to 7,500 and even 8,000 yard courses and more yards mean more acres to buy, more course to construct, more fairway to maintain and more money for the golfer to fork out.

In addition to getting the proper length and sequence of holes in the layout the architect should be careful to leave sufficient room between the various fairways. When there is continued paralleling of fairways there is not as much chance to segregate holes as in the triangulating method of design.

The question of handling galleries must be considered in designing the present-day championship course and ample room must be allowed to take care of the tremendous crowds that mill back and forth following their favorites.

Many times the less prominent players, particularly in medal competitions, have been completely thrown off their game by the crowd following the favorite overflowing or rushing to gain advantage point and thus greatly hampering those just behind or in front.

Having plotted a layout on paper after having given all the above points due consideration the architect now has a preliminary plan which is ready for the engineer to stake on the ground.

Most courses have entirely too many traps that are badly placed and poorly constructed; that cost too much money to maintain; and whose removal would help the average player, improve appearances, reduce upkeep, and practically leave the star player unaffected.

The Greenkeepers' Club of New England

By John Shanahan, Brae Burn Country Club

In January, 1923, a group of greenkeepers, in the Boston District, met to consider the advisability of forming an organization for social and educational advancement of greenkeepers and the greenkeeping profession. A letter was sent out to all the greenkeepers in New England, asking them to a meeting to discuss the matter further. At this meeting, which was held in February, 1923, about fifty responded to the invitation.

The Greenkeeper's Club of New England was organized at this meeting and was the first association of its kind in the country, founded solely for and by greenkeepers, themselves.

Since that time, regular monthly meetings have been held. The winter meetings are held in Horticultural Hall, Boston. At these times lectures have been given by authorities on various subjects pertaining to greenkeeping, as well as discussions among greenkeepers themselves, of the various problems confronting them. Each year the club has invited the green committee chairmen of New England to a luncheon meeting, to give them an idea of the aims and purposes of the club.

The summer meetings are held at various golf clubs. The first outdoor meeting of the club was a demonstration of golf course equipment. This was the first meeting of its kind ever held in New England and was attended by a large number of both green committee chairmen and greenkeepers. Since that time, this has been an annual event. At the other summer meetings the forenoon has been devoted to demonstrations and inspection of the course. After lunch and business meeting a golf tournament is held. It has been the aim of the club to visit courses where different problems could be studied.

The club has had a cordial invitation and welcome from the golf clubs visited and in several instances the club has been the personal guest for the day of the local green committee.

Two meetings have been held at the Massachusetts Agricultural College at Amherst where grass plots have been examined and lectures given by the college staff.

The club has shown a steady growth from the start and has now a membership of over eighty. A fine spirit of fellowship has been developed among the members. Many individual problems have been solved, and a better understanding between green chairmen and greenkeepers established.

Sulfate of Ammonia and Earthworms

Four years ago at Baltusrol earthworms or rather, worm casts, were regarded as a greater problem than either weeds or brown patch.

At that time ammonium sulfate was not used to any great extent—certainly not more often than twice a year, and then only in light quantities.

During the past four years the method of maintaining the putting green turf has followed very closely the general practice advocated by the Green Section of the U. S. G. A.

The only fertilizers used have been ammonium sulfate and ammonium phosphate, the former principally. They were applied either with topdressing or in solution by means of a proportioning machine.

No worm eradicator has been applied to any of the greens since August, 1926, and whilst the greens are still brushed before mowing, the worm casts are so few that this operation is hardly necessary. —Major R. Avery Jones, Baltusrol Golf Club.

QUESTIONS AND ANSWERS

All questions sent to the Green Section will be answered in a letter to the writer as promptly as possible. The more interesting of these questions, with concise answers, will appear in this column each month. If your experience leads you to disagree with any answer given in this column, it is your privilege and duty to write to the Green Section.

• While most of the answers are of general application, please bear in mind that each recommendation is intended specifically for the locality designated at the end of the question.

1. **Fairway grasses for sandy soil.**—A portion of our course is over high, dry land of a sandy soil with gravelly subsoil. On the fairways here the turf is cuppy, the grass growing in bunches with small barren spots between these bunches. We have consulted an architect with a view to improving these fairways, and he recommends that these fairways be spike-rolled in the fall and then spread with 15 tons of stable manure and 15 yards of clay loam per acre. After this dressing is evenly distributed, it is to be leveled with a brush harrow and allowed to lie dormant over winter. In the early spring the fairways are again to be spike-rolled two ways and 300 pounds of his general-purpose fertilizer applied per acre. The surface should then be brush-harrowed again and seeded with a special fescue fairway mixture at the rate of 125 pounds to the acre. This is then to be again brush-harrowed, and lightly rolled. We are sending you a sample of the top soil from these fairways. Before taking any steps in the matter we should appreciate your suggestions. We might add that we have experienced considerable difficulty in growing bent on this soil. (Maine.)

ANSWER.—The sample of sandy soil you send should, in our opinion, grow perfect turf. The program suggested by your architect is a very expensive one. Your soil is similar to types of soil where fescue is often employed with great success. The only other grass that does well on that type of soil is Rhode Island bent, which can be also secured as Colonial bent, from New Zealand, and in the South German mixed bent, of which it constitutes about 75 percent of the mixture. We would not advise you to spike-roll your present turf, or to disturb it in any way, but to seed on top of it, about the middle of August, a mixture of 10 pounds of South German mixed bent seed or Colonial bent seed (preferably the former) and 20 pounds of redtop seed, per acre. These grasses will take care of the cuppy lies, and in the course of a few years the redtop should disappear and the fescue probably be crowded out entirely by the bent. Of course, if before seeding you could at no great expense topdress the

fairways with a clay loam, it would be well to do so, although we do not consider this absolutely necessary.

2. A new fungicide.—A great deal is being said in this section regarding the use of Nu-Green. Our experience with calomel this year has been very satisfactory, but if there is anything better or more economical in the market we, of course, want to use it and therefore will appreciate a word from you on the subject. (Kentucky.)

ANSWER.—Nu-Green is a combination of a fungicide and a fertilizer with quickly available nitrogen. It is effective against brown-patch, but you are not likely to find it better and certainly not more economical than the calomel treatment, for as we recall you are using calomel combined with a fertilizer. Grass needs nitrogen after an attack of brown-patch to enable the plants to produce new growth to hide the scars. For that reason we have always been in favor of an application of some nitrogenous fertilizer soon after or combined with any of the mercury treatments whenever the greens need fertilizers. There are times when a green which is sufficiently or over fertilized is injured by brown-patch. In such cases it is obviously not necessary nor desirable to add more nitrogen with the fungicide. As has been pointed out in THE BULLETIN our results indicate that the effectiveness of Uspulun, calomel or other mercury fungicides used against brown-patch depend primarily on the amount of mercury contained. Since mercury is the most costly ingredient in these combinations it is well to compare how much mercury is carried in each rather than to judge entirely on the cost per pound basis. One and one-half ounces of calomel contain approximately the same amount of mercury as one pound of Nu-Green. In addition to the fungicide one pound of Nu-Green contains nitrogen which is equivalent to that contained in one-half pound of urea, a little over one pound of ammonium sulphate or about 4 pounds of cottonseed meal. Since we do not know the prices your club pays for these different materials we shall leave the actual figuring of relative values to you.

3. Improving thin turf on fairways.—Our fairways are thin and will stand considerable reseeding. They were originally seeded with fescue. What would you recommend for permanent improvement? (Michigan.)

ANSWER.—The great majority of the better golf courses of the country have bluegrass fairways, always containing more or less white clover. In seeding fairways we have always recommended a mixture of bluegrass and redtop. Redtop grows much more rapidly but does not persist any great length of time. It is therefore very valuable as a somewhat temporary grass; besides it reduces the seed bill greatly. Under your conditions we would recommend a mixture of bluegrass and redtop in the proportion of 4 pounds of bluegrass to 1 pound of redtop. The redtop seeds are much smaller, so that in reality the mixture would contain more seeds of redtop than of bluegrass. This mixture should be sown between the middle of August and the first of September. The surface of the soil should preferably first be scratched, and if possible a topdressing applied. If you desire white clover also (to which there is no objection on the fairways), add one-fourth pound of white clover seed to the above proportions.

Where there is no grass at all this mixture should be seeded at the rate of 150 pounds per acre, but on your fairways probably 20 pounds per acre would be sufficient to fill in the thin spots. Do not use fescue. We are sure you would be disappointed with it. A good bluegrass fairway is equal to any, although in the New England states the bluegrass seed might advantageously be replaced by bent seed in the same proportions. Where there is even a small stand of grass in your thin spots we would advise you simply to topdress these spots during the winter with manure or good top soil, preferably the former.

4. Converting bluegrass-redtop greens to bent greens.—We have 9 bent greens, planted from stolons, and 9 bluegrass-redtop greens. We have been so well pleased with the bent greens that we desire to convert the bluegrass-redtop greens into bent. Can we convert these bluegrass-redtop greens to bent greens by sowing German mixed bent seed on them? (Nebraska.)

ANSWER.—Yes, and the best time to do this work in your location is about the first of September. In two or three years you should have practically pure bent greens. Of course the turf will be of mixed strains of bent, and not the uniform turf that you get from planting stolons. Moreover, the cost of seeding will probably be much below the cost of planting stolons. A number of clubs have gotten very good results by sowing chopped-up stolons of creeping bent on top of a green of other grass which has been cut very short, about the first of September, and then topdressing. If a green is thus treated and is kept out of play for two or three weeks the stolons will become well established and you can then go right on playing. It is important, however, to keep the green out of play for two or three weeks after sowing and topdressing the stolons, although we know of cases where greens have been successfully converted to creeping bent by this method without being taken out of play at all.

5. Bone meal as a fertilizer for fairways.—Some of our fairways are in need of fertilizer. Do you know of any fertilizer better for the purpose than bone meal? (Rhode Island.)

ANSWER.—The best fertilizer that we have found for fairways is barnyard manure. This may be applied any time during the winter, or in the late fall. In the absence of barnyard manure we would prefer fish scrap, cottonseed meal or tankage. From our recent observations we are inclined to advise against the use of bone meal as a fertilizer for fairways, and under no conditions would we advise its use on putting greens.

6. Whether to reseed fescue greens with fescue or with bent.—Our greens, which are several years old, contain a large portion of fescue. In reseeding them, where necessary, would you advise us to use fescue or bent grass? (Alberta.)

ANSWER.—We are not familiar with the behavior of fescue under your conditions. If it forms a satisfactory turf it would not be advisable to reseed with bent, as the two grasses do not blend satisfactorily for good putting turf. If, however, it is your experience that the fescue is killed out by close cutting, as it generally is in the United States, we would advise you by all means to use bent for reseeding.

Waco, Tex., August 3, 1927.

Editor of the BULLETIN,

DEAR SIR: Noting your article in the July number of the BULLETIN, Subject *Poa annua*.

I am quite familiar with conditions in the Philadelphia district and in Texas. I have never seen a green benefited by *Poa annua*. Any grass that grows in tufts or bunches will never make a true green. I have seen it at its best (or worst) in greens in the Philadelphia district in the spring of the year and while these greens may be said to be very fair as to texture they are not true and many putts are missed by reason of their unevenness.

While I realize that in some sections and on some golf courses it grows so abundantly that it would be too expensive to eradicate it, nevertheless when it is not so abundant and the club has sufficient funds I would unquestionably advocate its removal and endeavor to keep it out. In Texas if allowed to take possession of a green, it has a very detrimental effect on the Bermuda grass, retards its growth in the spring, consumes nourishment, and develops brown patches after the Bermuda starts to grow, and while it dies down and disappears during the month of June it is a menace and should be gotten rid of if possible, and as early as possible.

It has taken us three years to eradicate it from our greens at Spring Lake Country Club here, but it has been well worth while and the cost has been money and effort well spent.

Every spring it appears in lesser quantity in the greens but we get it out and go so far as to take it out around the edges of the greens for a certain distance so that the seeds will not blow or wash onto the green, but as most of our greens are built up this is not difficult. In eradicating it we have had great success with sharp tooth rakes which not only get a good deal of the *Poa annua* out but help the Bermuda by pulling out the old runners and dead roots, and renovating; this followed by hand work completes the job. "No Sah, I am dead agin Po Anna" as our colored brothers "calls him."

Yours very truly,

HENRY P. SMITH,
*President and Chairman of the Green Committee,
Spring Lake Country Club.*