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A MONTHLY PERIODICAL TO PROMOTE THE BETTERMENT OF GOLF COURSES

CONTENTS.

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Planting Fairways with Creeping Bent Stolons

The perfecting of machinery by which an entire golf course may be planted with bent stolons is a new milestone in the advance of the technique of course construction. The illustration is of a portion of the operations on the new Marble Hall Golf Course near Philadelphia.

The machine in the lead spreads the cut stolons evenly. The machine which follows top-dresses the spread stolons uniformly with a fine compost. The roller in the rear completes the job.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, OF THE BULLETIN OF THE GREEN SECTION OF THE U. S. GOLF ASSOCIATION, PUBLISHED MONTHLY, AT WASHINGTON, D. C., FOR OCTOBER 1, 1924.

District of Columbia, ss:

Before me, a notary public in and for the District of Columbia, personally appeared W. B. Lydenberg, who having been duly sworn according to law, deposes and says that he is the business manager of the Bulletin of the Green Section of the U. S. Golf Association, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are:

Publisher, Green Committee of the U. S. Golf Association, 423 G St., N. W., Washington, D. C.

Editors, C. V. Piper and R. A. Oakley, P. O. Box 313, Pennsylvania Avenue Station, Washington, D. C.

Managing editor: none.

Business Manager, W. B. Lydenberg, P. O. Box 313, Washington, D. C

2. That the owners are the United States Golf Association, a mutual organization of golf clubs. Pres., W. D. Vanderpool, Newark, N. J.; Vice Pres., R. A. Gardner, Chicago, Ill.; Sec'y, C. S. Lee, Tuxedo Park, N. Y.; Treas., E. S. Moore, Roslyn, N. Y.

3. That the Association has issued no bonds, stocks, mortgages, or other securities.

(Signed) W. B. Lydenberg, Business Manager.

Sworn to and subscribed before me this 1st day of October, 1924.

(Signed) BERNARD CONNOR.

My commission expires August 6, 1927.

Mottled Condition of Bent Turf

By R. A. Oakley

In the fall of the year, and frequently in the spring, bent greens, particularly those of velvet bent and certain strains of true creeping bent, sometimes exhibit a mottled or more specifically a spotted appearance. This mottling or spotting is due to small tufts of grass quite unlike the surrounding turf in color, and somewhat unlike it in texture. They are light yellowish-green, and each individual spot is rarely more than 2 inches in diameter, and usually less. Many of those who have observed them have concluded that they are caused by the invasion of some weedy grass, such as *Poa annua*. Others think they represent an unhealthy condition caused by a lack of one or more of the important fertilizing elements. The writer and his associates have studied the phenomenon casually for several years. A close examination shows the small tufts or rosettes which cause the mottling or spotting to be made up of young grass plants produced on the stems of the older plants. Botanically the tufts or rosettes are proliferations from the older turf. So far as can be ascertained they are not due to any fungous disease or to any insect or nematode. Furthermore, applications of ammonium sulfate and ammonium phosphate have not been beneficial in discouraging their formation.

It is thought that possibly the yellowish green spots might be the result of a condition similar to that existing in the pineapple fields of Porto Rico and Hawaii. Therefore iron salts were sprayed on the turf exhibiting them, but without noticeable results. Light dressings of compost, on the other hand, have had a tendency to cause the turf to return to a normal condition,—that is, to discourage the growth of these somewhat unsightly tufts. The cause of their formation is still obscure, but it is being studied, and it is hoped that some definite and simple remedy will be devised for their treatment. They are not objectionable on greens from the standpoint of the game, but they are, to say the least, unsightly on fine bent turf.

The Bulletin of the Green Section goes to press the first of each month. Contributors will please bear this in mind.

Burning Over the Rough

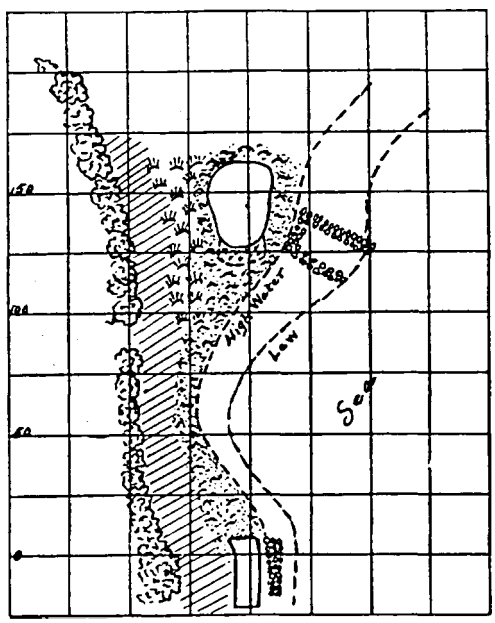
By Maynard M. Metcalf, Oberlin Golf Club, Oberlin, Ohio.

In THE BULLETIN for January, 1923, page 24, is the statement, "Burning over the rough in fall or winter is probably good practice. It doesn't harm the grass and does kill a lot of bugs." Without questioning the wisdom of burning the rough upon most courses, may I tell of an experience on the course of the Leland (Michigan) Country Club, where burning the rough caused injury?

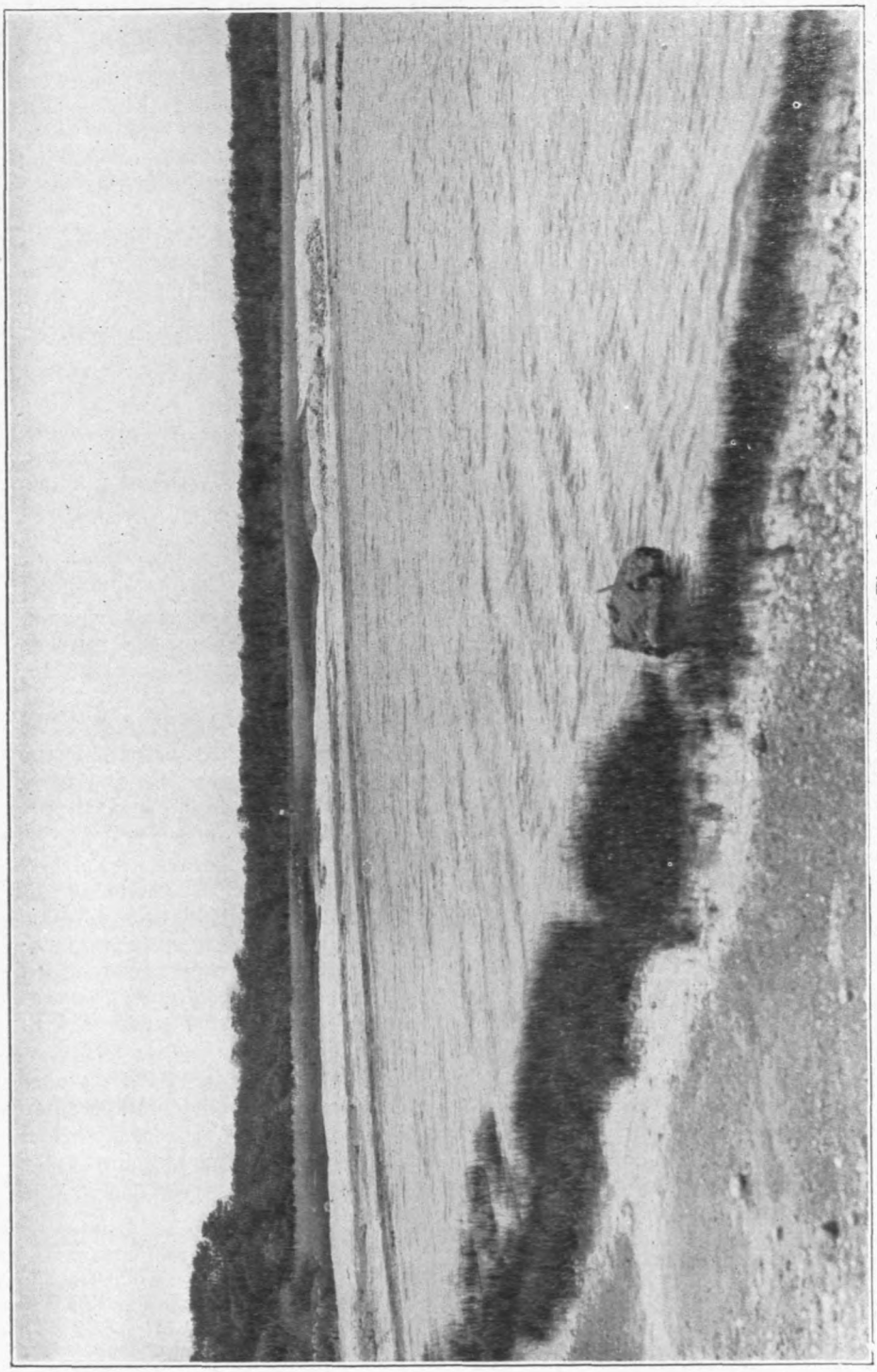
The soil on that course is gravelly sand and its rough is by far the best I have ever seen on any course,—clean Canadian bluegrass, a moderately thick stand, yet thin enough to make it very easy to find balls. The stalks of the grass are so wiry that it is almost impossible to force any club through it. One has to select a well-lofted club, preferably a heavy one, and come down upon the ball from above at a high angle, lifting the ball at once out of the grass, for it can not be forced ten feet through this wiry grass. The greenkeeper, in burning waste late in the fall, inadvertently let fire run through a considerable area of the rough. The following year the grass on this area was too thin, not nearly so good as on the unburnt portions, and it took two years for it to recover and become about as good as before burning. This experience suggests only that burning Canada bluegrass rough on a very light sandy soil may cause injury. It does not argue against the practice under other conditions.

Instructive Golf Holes XIV

No. 3, Kittansett Club, near Marion, Mass. (145-165 Yards)



The new golf course of the Kittansett Club is one of outstanding excellence. Our illustration shows a mashie hole, the shot for the green being over a course of sea beach. Essentially the putting sward is a raised island surrounded by a waste of sand, a very simple but a very effective hole. The beach and the water are primarily mental hazards. Either a slice or a pull invites a lot of trouble.



Hole No. 3, Kittansett Club. View from tee.

An Interesting Letter about Vegetative Greens

"You will recall that in the fore part of September, 1920, you were good enough to forward to me, for use of the Moorestown Field Club, Moorestown, New Jersey, some creeping bent runners to enable us to establish a nursery to supply runners for the construction of putting greens the following year by the use of your then comparatively new vegetative method.

"I have long intended to report to you our degree of success in the new field of work then undertaken under your direction, and to extend to you an expression of our sincere gratitude; but I am sure you will appreciate that the duties of a green committeeman absorb all of the time that can be spared from business and golf.

"The strains of creeping bent runners sent by you can only be identified by reference to your numbers accompanying the shipment; these were 02529 and 02568, respectively. You sent us at the same time some velvet bent runners, numbered 02537 and 02540. These velvet bent runners did not do well in our nursery and no attempt at putting green construction was made with them; they have since been plowed under to make room for creeping bent runners.

"Our creeping bent nursery was planted in rows six feet apart, in accordance with your directions, in the middle of September, and in the following August (1921) our nursery was one complete mass of runners, overlapping between the several rows. A photograph of the nursery taken in August, 1921, will be found in THE BULLETIN, Vol. I (1921), page 181.

"Our green construction from this nursery began early in September of that year. Our method was to plant one half of each of two of the old greens each year—either the right or left half in the line of play—leaving the other half for the use of the players.. The following fall the remaining halves of these greens and one half of two additional greens would be planted. In this manner we have interfered with play to no considerable extent, and at this time no one could detect by the closest inspection that the greens have been planted in two sections.

"We found little choice between the two strains of bent sent to us; but our 1921 nursery, planted in the same space which had been occupied by the old one, was planted with your strain 02529,* since we thought we saw a slight preference. We have since maintained the nursery with that strain exclusively, planting a new nursery each fall.

"We now have six greens in vegetative bent, one in South German mixed bent, and the other two (our course has only nine holes) are to be planted in vegetative bent next fall without resorting to the method of doing one half of a green at a time. The players are now quite willing to use temporary greens in anticipation of procuring the new ones sooner.

"I scarcely know how to refer to the quality of our vegetative creeping bent greens with accuracy; to understate their quality would be quite as unpardonable as to overstate. They are certainly all that the human heart can crave; I think no member of our club will say less. I regret that it has not been my privilege to inspect many vegetative

* Strain No. 02529 is Columbia bent, the one to which the famous No. 9 green at Columbia Country Club was planted.

greens at other courses; there well may be others of superior quality. But with the limitations of my knowledge of possibilities I can not see how any putting green sod and grass can be more perfect than ours. Several of the leading seed houses have sent out representatives to inspect all vegetative greens they could find; these men have uniformly told us that they considered ours the best that they have found. Giving liberal allowance for their desire to please, yet we can properly conclude that they think we have obtained excellent results; especially since several have procured runners from our nursery to start nurseries for the seed houses they represent.

"Of course we appreciate that quality includes more than desirable texture, color, and dense and vigorous growth. We can not be certain that our vegetative greens are immune to brown-patch or other diseases. We only know that up to this time no trouble of that nature has appeared on any of our vegetative greens. We use Bordeaux mixture in powder form at times as a precaution when we think it might be needed as a preventive; whether it is needed, we do not know.

"At the risk of tiring you, permit me to refer to our methods of treatment. Our sole treatment is top-dressing; we use no ammonium sulfate or anything else. More and more we become convinced that top-dressing with good compost is the one thing vegetative greens need. This we apply every few weeks during the entire season, and apply it so finely sieved that it does not interfere with play. We can almost hear a green say 'thank you' when it is applied; it greets us at once with a deeper shade of green, and unmistakably rejoices.

"Our composts for top-dressing are alternate layers of sod and manure. Nothing else, except sometimes a layer of muck from a nearby swamp, is used. When any muck is used we give it a coating of lime, of course taking care that the lime does not come in contact with the manure. To this compost, when fully decomposed and repeatedly forked into a complete mixture, we screen and add about one-third sand, nothing else. Perhaps ammonium sulfate would add to its virtue; but we have been inclined to leave good enough alone.

"Our sod is dense, and drifting weed seeds find lodgment difficult. Of course dandelions, crab grass, and clover appear at times; but our policy is to remove them at once either with a weedknife or by plugging. We maintain sod to supply plugs, and our experience is that the cost of weeding can be properly charged to neglect of prompt action.

"Pardon this long letter. It is not intended for publication, but is designed as a much overdue report on the stolons you so graciously supplied us."—*Judge E. B. Leaming, Court of Chancery of New Jersey, Camden, New Jersey.*

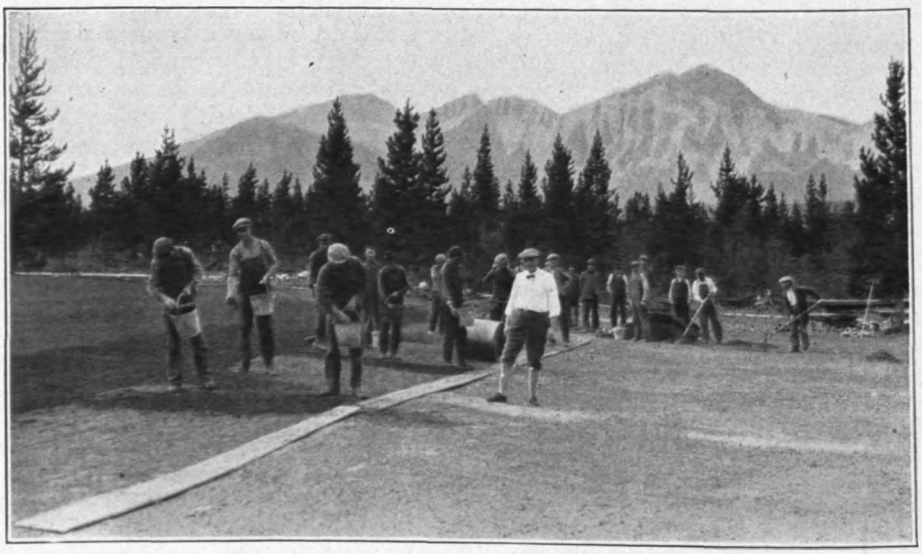
(In a subsequent communication, Judge Leaming granted permission to publish his letter, and added):

"I am inclined to think that almost any information or experience pertaining to vegetative bent is at this time much needed. I am amazed to find how many enthusiastic golfers, including many green committees, are utterly ignorant of the process and the excellent results that can be obtained by its use. An impression also seems to exist that it is expensive. My judgment is that if a golf course maintains its own nursery, instead of buying stolons, the expense is very much less than planting German mixed bent seed, and the cost of maintaining a vegetative green is surely

much less after planting than that of sown greens. We find it advisable to reinforce our mixed bent green with a new sowing of seed every fall; this involves labor and cost of seed, from which vegetative greens are exempt. Indeed, to be effective, sowing seed on old sod involves much well-directed labor, since every seed is wasted the roots from which are not given a means to reach the soil below. We find also that our German mixed bent greens require more weeding and other attention than the vegetative greens. This latter feature, I think, is due to the density of the sod and grass on our vegetative greens, rendering it more difficult for weed seeds to find lodgment in the soil."

Planting Vegetative Greens among the Pines in Canada

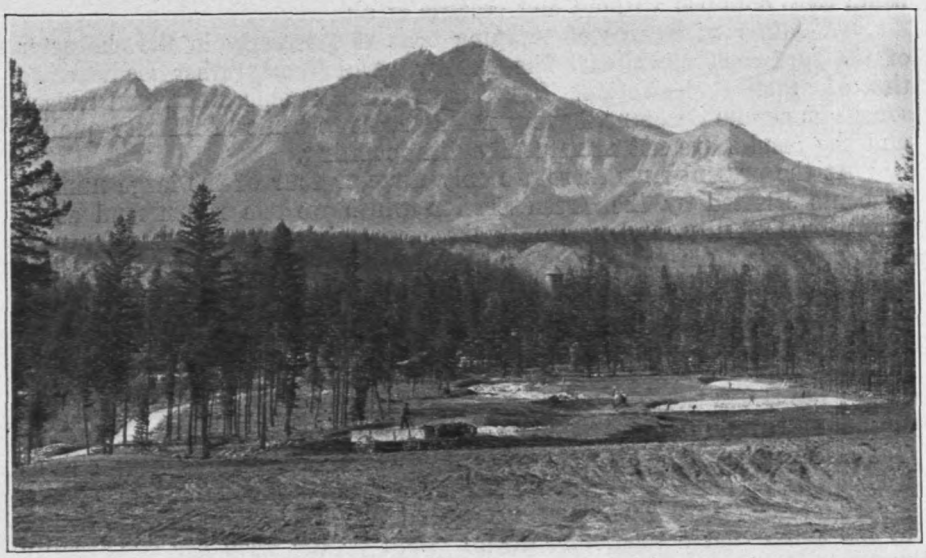
The accompanying illustrations are interesting in showing the northward advance of the creeping bent putting green and the successful methods which have been worked out for the planting of such greens vegetatively on a large scale. The views are of the new course laid out by the Canadian National Railways at Jasper, Alberta, in the Canadian Rocky Mountains, about 1,200 miles northwest of Winnipeg. In one of the photographs the actual operation in the planting of the stolons is seen, and in the other a view of No. 18 green is given as seen from the tee 300 yards distant. The 18 greens were all planted in August of this year with stolons of the Washington strain of creeping bent.



Planting creeping bent stolons at Jasper, Alberta.

The interest shown by the railroad in transforming a rocky situation of this character into a golf course of real beauty is inspiring especially when it is considered that most of the top soil had to freighted in and hundreds of tons of rock had to be blasted and removed. An adequate water supply has been arranged for by a reservoir built in the mountains, the water being carried through the fairways by a 6-inch main, from

which 3-inch pipes extend along the side of each fairway, and from these in turn 1¼-inch pipes extend to the putting greens. In this manner an unlimited water supply at 160-pounds pressure has been provided.



No. 18 Green, at Jasper, Alberta, as seen from the tee.

It will be of interest also to note that the railroad has just completed another beautiful course at Minaki, Ontario, 120 miles east of Winnipeg, where likewise the 18 greens have been planted from creeping bent stolons.

Confusion in the Identification of the Named Strains of Creeping Bent

By C. V. Piper and R. A. Oakley

In the October BULLETIN was published a list of the seven strains of creeping bent named by the United States Golf Association Green Section. Much recent correspondence has revealed that there has been a lot of confusion in regard to the identities of these strains. Beginning in the fall of 1921, before any of these bents were given names, a number of them were sent to golf clubs to start nurseries, each kind being designated by a number. Later, names were given to the seven which in our trials showed greatest promise. Some of those sent out at first, have never been given names,—indeed, have been discarded by us. The confusion which has occurred is perhaps due to three causes.

1. A first possible source of error may have been mislabeling at the time of shipping; but if this error has occurred at all it was in a very few cases.

2. A second source of confusion is due to the idea held by many that any bent obtained from Washington is "Washington" bent. This last

name applies to one particular strain, not to any bent distributed from the Green Section.

3. A third probability is that the clubs, and even commercial concerns, did not keep their records straight. Indeed in many cases the bents were obtained without any records at all.

The different strains of creeping bent vary greatly in the character of the turf each produces. The quality varies from rather mediocre to that of practical perfection. Very unfortunately some clubs, and indeed some commercial concerns, have planted greens to bents of inferior quality and the results are not unnaturally disappointing.

At the present time there are only three or four of the large number of bents selected by the Green Section which we can recommend as of exceptional quality, and now only these are being sent to clubs for nursery purposes. There may be and doubtless are better bents than those we have tested sufficiently; so everyone interested should feel that there are still excellent opportunities to find one ideal for his locality. Apart from a greenkeeper's own selection, the records of which he would be interested in keeping straight, it would be wisest for him to grow but one of the Green Section bents, as it is difficult to handle nurseries of two or more strains without getting them mixed.

Before the great degrees of difference in the various bent strains were fully realized, the Green Section sent out some varieties to clubs for experimental trial which it has since discarded. These were sent out in the belief that a particular strain might be the ideal for one locality if not for others. This may indeed be a fact, but the evidence now at hand indicates that if a bent is not of very high quality under Washington conditions it is hardly likely to be so elsewhere.

The Green Section hopes that if any club has secured unsatisfactory results due to using a poor strain of bent, it will not be discouraged to go ahead with a good strain.

We earnestly advise each club, and doubtless this would apply to dealers also, to plant their nurseries to only one *pedigreed* strain of bent of proved quality. No other strain should be used by any club except in purely experimental tests in comparison with some other strain of proved quality.

Watering Putting Greens

In the October number of THE BULLETIN (page 245) opinions from a number of men were given with regard to the best time of day for watering putting greens. After the October number went to press some additional statements were received which we are glad to present herewith.

"In the old days we were brought up to believe that it was dangerous to water grass in summer until the heat of the day was over. Recently we have come to believe that no such danger exists, and at both Merion and Pine Valley we are inclined to water at such period of the day as best fits in with the other plans for upkeep. Our greenkeeper at Merion seems to feel that with small brown-spot he gets a good result by watering in the early morning, using a rose nozzle, and in this way washing the cobweb or mycelium off of the grass. Theoretically this would seem to

be wrong, as one would think it would simply wash the germs away from one place and spread the disease over the green; but practically he seems to feel that it gives a good result. During the hot summer months, when there is a danger of burning from the use of ammonium sulfate, we find that we can apply the chemical safely in the evening and water it in during the night. I think our general feeling is that we use water whenever it best suits us; but the two objections to watering in the early part of the day are, first, that you lose a lot of moisture from evaporation, and second, that you interfere with the play of the course."—*Alan D. Wilson, Pine Valley Golf Club and Merion Cricket Club.*

"Because of the almost continuous play during our season we have been obliged to water in the late afternoon or at night. Some of the greens are in low land and are naturally moist, but those in the upper part of the course are thoroughly saturated about three times a week during dry weather. Following this method and the advice given by the Green Section, the greens have been in wonderful condition."—*James L. Taylor, Ekwanok Country Club, Manchester, Vt.*

"I should say that putting greens should never be watered in the bright sun. Newly planted greens should be carefully sprinkled so that the seeds are not washed away. I have seen just as good results from soaking a green from 2-inch hose as I have from light sprinkling, because the water gets down into the roots and does not stay on the blades of grass, which tends to forcing—to use a greenhouse term. In general the rule should be to water the greens when they need watering. Sometimes people water greens when they need top-dressing (which we might call food), or fertilizer, whether chemical or otherwise (which we might called a tonic). It is therefore a matter of practical experience with each green. Our experience here at Kittansett would seem to be that the greens which are naturally the wettest from heavy dews give the most trouble from brown-patch. When the dew is light and there is very little rain, we water three nights a week, say two nights from four in the afternoon until seven, and one night a week from four until eleven. That is in times of excessive dryness. We have tried watering in the early morning. I have seen no results to prove that this is better than watering at night. We believe that we get better results from some ammonium sulfate if we do not put on too much water to wash the chemical too deep into the soil. I can not say that our experience would demonstrate that watering prevents brown-patch. I can not make any connection between watering and brown-patch."—*F. C. Hood, Kittansett Club, Marion, Mass.*

"In my opinion the greens are watered for two reasons: (1) to soften the surface of the green so that balls properly played on them may hold; (2) to furnish proper conditions for the growth of the grass. The time of day for watering to achieve the first purpose is governed by the convenience of the players. As for the second purpose, it should be remembered that nature rains at all hours, and that grass which is burned even decidedly brown recuperates with rain which falls at any time provided it is in sufficient quantity to soak the surface thoroughly. Our watering for turf growth is done either early in the morning or in the late afternoon or at night. We use a rotary spray for the general surface of the green. For some of the mounds on the edges of the green,

where we decide to concentrate the water on the higher spots, an ordinary fountain type spray is used. Unquestionably when watering is done in the day time it will be necessary to use more water as the evaporation will be greater both from the sun and wind than is the case with a night application. We have believed here at the Yahnundasis Golf Club that a first-class thorough soaking was much preferable to more frequent light applications of water. Over a period of years in which I have been in close touch with the green work at the club here, I have not been able to notice any difference in the texture of the turf in relation to watering it at different periods or in different quantities. Believing that it is wise not to let the greens dry out, we have started watering here as early as the first of May, and have watered so that our turf has been kept in a proper growing condition throughout the season. Throughout the summer months, I question whether it is possible, under any normal routine, to overwater greens from the standpoint of the welfare of the grass, but I do believe that it is possible to overwater greens from the standpoint of the play thereon. We here at Utica are in a natural rain belt, so that our water problems are not ordinarily as great as those in some parts of the country where the summer season means long stretches of intensely hot, dry weather."—*Sherrill Sherman, Yahnundasis Golf Club, Utica, N. Y.*

"In the Chicago district most of the golf clubs make a practice of watering 9 greens every morning, starting the sprinkling about 5 or 6 o'clock. This means that on an 18 hole course all of the greens are actually watered every other day during the dry weather. In some instances where the water supply is limited some of the greens are watered during the day quite often. Teeing grounds are sprinkled in the morning, but as yet in our observations we have not noticed any real benefit in late afternoon watering as against sprinkling in the hot sun. The past season has been terribly wet in this district more than two or three times, and this occurred during the spring months, so that it has been impossible to carry on any experiments in watering. We have actually had too much water, and where drainage conditions have been poor the turf has suffered considerably. In fact, on the greens planted vegetatively with certain strains of bent, the grass has become very unhealthy, causing very little growth at times and a thin, yellow or spotted turf. In many instances, the knives of the mowing machines have had to be set up a little, because cutting the grass too closely when wet seemed to cause brown spots in the hot sun.

"Some of the clubs have tried early morning watering, but this interferes with the mowing of the greens. A preferable time for watering seems to be every evening excepting Saturday, when the play is usually late, and then it is not sometimes advisable to have the turf too wet early Sunday morning for a heavy play over the week end. In other words, half of the greens are watered Sunday, Tuesday and Thursday evenings, and the other half Monday, Wednesday and Friday evenings. With a few exceptions, under heavy moist soil conditions, it is only necessary to water 6 greens a night, all of the greens being watered twice a week instead of three times. The drainage and soil conditions on putting greens, I think, are more important factors in determining the amount of artificial watering necessary for best results than the time of day the water should be applied; but as mentioned above, the wet season in this district this year has made it impossible to form any

definite conclusions."—*Leonard Macomber, Chicago District Golf Association.*

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

QUESTION.—In a foursome in which I was playing, my ball stopped under a bench at one of the tees and was in such a position that it was impossible to play it. The members of my foursome said that I could lift and drop the ball not nearer the hole, as the bench would come under the class of objects which could be considered for upkeep of the course. On reaching the club house I asked several members and received a different opinion. In looking up Rule 11 I am frank to confess I am still in doubt, as it states that a ball can be lifted when touching "box or similar obstruction."

ANSWER.—The situation you describe should be covered by a local rule, and it is the duty of your local committee to frame local rules to meet special contingencies on the golf course. In the absence of a local rule, the ball would have to be played from where it lay.

QUESTION.—According to Rule 15, in match play the player may take a practice swing within a club's length of the ball, but under Rule 34 it says that where no penalty for a breach of rule is stated the penalty shall be the loss of a hole. Then in Rule 15, stroke competition, it states, "The rules of golf, so far as they are not at variance with these special rules, shall apply to the stroke competition." It has always seemed to me that there is an unwritten law that the penalty for playing a practice swing within a club's length of a ball in medal competition is one stroke, and yet I can not find any record of the same.

ANSWER.—The paragraph under Rule 15 is not a Rule of Golf. It is a ruling made by the United States Golf Association to advise players that they may take a practice swing or swings more than a club's length from the ball and displace turf without violating the provisions under Rules 10 and 25. If the provisions under these Rules are not violated, there is no penalty for taking a practice swing within the area designated as a club's length from the ball.

QUESTION.—In a foursome playing match play, a player off the putting green approximately 50 feet from the hole, chipped his ball against the flag stick, which was still in the cup, and holed out. There was no player or caddie near the pin when this stroke was made, nor had either the player's side or the opponent's requested this. The player who chipped the ball into the hole with the flag stick still in it, did this on his third stroke, two strokes lower than his opponent's. The ruling requested is to determine whether or not the side having the low ball won the hole or lost it due to sinking the ball with the flag stick still in the cup. We have received many conflicting opinions on this play.

ANSWER.—Rule 32 covers this point. There is no penalty for a player hitting the pin from any distance in match play, as the opponent's side always has the right to have the flag removed if it so desires.

Golf Course Grasses in Tropical and Subtropical Regions

By C. V. Piper

As the number of golf courses increases in regions of perpetual warm weather, the interest in securing the best turf grasses develops in proportion. None of the temperate grasses are at all adapted as perennials to regions free from any real winter weather. To meet the needs of the warmer countries, an entirely different series of grasses is a requisite. Thus far the turf grasses of warm countries have received but a small fraction of the attention that has been devoted to the study of temperate grasses. The tropical and subtropical turf formers are far more numerous than the temperate species, and with the exception of a few, little is proved of their capabilities except in the region to which each is native.

The information here set forth is based on observation and studies in south Florida, Louisiana, California, Cuba, Panama Canal Zone, Philippine Islands, China, Java, India, Ceylon and Egypt. It includes also such information as has been published by competent investigators.

On many tropical golf courses the fairways are made up of grasses which appeared spontaneously. Where fairways have been sown or planted, Bermuda grass has most frequently been used, but not rarely other grasses have taken preponderating or complete possession.

There is as yet no tropical turf former known which will make putting greens of equal quality to either creeping bent or velvet bent. However several of them properly managed make putting greens of very excellent quality, at least in certain regions. These include Bermuda grass, Acapulco grass, and Manila grass. There is reason to believe that eventually tropical grasses will be found which will produce putting greens of the highest quality. The information here set forth should be of at least suggestive value to all golf clubs in warm countries.

The extent to which any of these grasses will be purposely used, so far as fairways are concerned, will depend largely upon commercial seed supplies, and partly on the ability of the grass to spread from a small start. As to putting greens, quality is of all importance, and the vegetative method of production is not too expensive if the grass possesses the desirable fine quality.

Commercial seeds of Bermuda grass and of carpet grass are available in quantity. Where either or both of these grasses succeed well there is little use of securing other fairway grasses. Where neither succeeds well it will be desirable to start small plots of other turf grasses, as one or more of them is practically sure to spread of its own accord. Of course this process can be speeded up by planting vegetatively small patches here and there throughout the fairways and rough.

For putting greens the finer strains of Bermuda grass give at least fair satisfaction especially if the soil be fairly heavy. Acapulco grass holds much promise as a putting green turf grass, and Panama carpet grass is worth careful trials. Manila grass is inclined to be a little stiff, but in the Philippines at least makes beautiful turf.

It would be a splendid thing if every tropical golf club would devote an experimental area to the testing of the grasses here described and any others which appear promising. In this way a large amount of information would soon be accumulated.

Bermuda Grass (Cynodon dactylon).—This is the best known of all the tropical turf grasses. In India it is called doob or hariali; in Australia

couch grass; in other countries wire grass and devil grass. Perhaps Bermuda is purposely employed on warm-country golf courses more than all other grasses combined. It thrives well from the equator far northwards and southwards, the hardier strains surviving even zero weather. It is rarely used however, where truly temperate grasses will thrive, as its brown color in the cold season is not attractive. There are numerous varieties or strains of Bermuda grass, and the best of them make very excellent putting turf especially on heavy soils. While commercial seed is plentiful, the fine strains must be propagated in the vegetative way, as the seed produces many different strains.

Carpet Grass (*Axonopus compressus*).—Carpet grass is a native of Central America and the West Indies, introduced about New Orleans before 1832, as a specimen collected then is still preserved. The grass has spread over the whole coastal plain area from Norfolk to Galveston and inland about 200 miles. It is a splendid turf grass for fairways—indeed ideal. Typical examples of its excellence may be found on the golf courses at New Orleans; Biloxi, Mississippi; Jacksonville, Florida; Charleston, South Carolina; and Wilmington, North Carolina. Commercial seed is available in quantity and the grass is easily established by sowing on other turf, wherever the conditions are suitable. The grass will not grow on the drier lands, but in soils of reasonable moisture capacity it will quickly replace all other grasses in the regions to which it is adapted, especially on sandy soils.

Giant Carpet Grass (*Axonopus furcatus*).—This grass is native in the coastal plain of the South and in the West Indies. It is coarser than carpet grass and requires more moisture. For very shady places it is excellent. The seed falls off promptly even before ripe, so it will never be a commercial article. In other words, the grass if planted will ordinarily have to be planted vegetatively. Giant carpet grass shows considerable tendency to invade putting greens where it is not desirable. On the whole the grass is valuable only where it occurs naturally.

Panama Carpet Grass (*Axonopus purpusi*).—This is a fine-leafed rather bunchy sort of carpet grass native in Central America. On the golf courses of the Canal Zone it makes better turf on the fairways than any other grass. It is likely however to be valuable only where it is native and in regions where it will spread of its own accord. The turf of Panama carpet grass will probably prove highly satisfactory for putting greens.

Bahia Grass (*Paspalum notatum*).—This is the grass which makes up most of the turf at the Havana Country Club. On the moister ground it is practically pure and forms a very dense, tough turf, moderately coarse in texture, that is of superb quality for fairways. On the Canal Zone golf courses and lawns it is likewise abundant. Bahia grass occurs naturally from the West Indies and Mexico to Uruguay and Argentina. In many places, as in western Cuba, Costa Rica, parts of Uruguay, it is the most abundant pasture grass. By the natives it is called "cano mazo," that is "mat grass," in Cuba; "gengibrillo," or "ginger grass," in Costa Rica; "pasto dulce," or "pasto manso," in Argentina. Bahia grass is succeeding admirably in Florida and along the Gulf Coast. Seed is obtainable from Cuba and from Costa Rica, but does not germinate as well as might be desired. However the grass spreads naturally when once established, so much indeed that it is safe to prophesy that in time it will

be one of the most abundant grasses of Florida. Bahia grass forms a heavy tough turf even on very sandy soil. This is due to its thick tough horizontal rootstocks, which make a sort of pavement, as it were. For this reason it is a particularly desirable fairway grass on light soils. It remains green down to the freezing point.

Acapulco Grass (*Opizia stolonifera*).—This perennial creeping grass was discovered 100 years ago at Acapulco, Mexico. It is now known to grow over a wide area in the western part of southern Mexico, a region with a long period of drought each year. In some way it became introduced into Cuba about 1906 or earlier. The reasons for this conclusion are that the grass was not reported by the botanists who explored Cuba previous to 1906; and besides, very few plants occur naturally either in Cuba or in southwest Mexico. Furthermore, its rapid spread in Cuba and the manner in which it crowds out native plants, suggest that it is an introduced grass. In a general way it resembles Bermuda grass, but botanically is very different, as it has two very different kinds of flower clusters on the same plant, one consisting of male flowers, the other of female flowers. It makes very dense turf and grows even on the surface of practically bare limestone rock. It is doubtless very drought resistant, as the dry season of southwest Mexico is a prolonged one.

Wherever the grass occurs in patches in Cuba it is closely grazed by animals, and thus treated it makes a very splendid turf. Our present knowledge of its value for golf courses is largely the result of the investigations of Mr. Frederick Snare, of the Country Club of Havana, whose attention was called to the splendid turf this grass made about the Colon Cemetery. It bids fair to make putting greens superior to those of Bermuda grass. Under Cuban conditions various weeds invade Bermuda greens, so that the greens must be renewed frequently to be really satisfactory. Acapulco grass, however, to judge from an area of about 100 square feet, holds its own against all the weeds. Mr. Snare has plugged all his greens with hole-cutter sized pieces of Acapulco turf, and these rapidly increase in size, so that in a comparativly short time the greens will be solid Acapulco grass. The texture is at least equal to Bermuda, and the color a little paler; but with the practical assurance that weeds can not invade the Acapulco grass, the turf will be perfectly uniform.

For fairways Acapulco grass will provide ideal turf, and it should be particularly valuable in regions where long droughts occur. It is quite likely that it will be useful in south Florida, in southern California, and probably in Chile, South Africa and Australia.

Java Grass (*Polytrias praemorsa*).—This grass forms the natural covering of lawns and parks on the heavy soils of western Java, making a pure turf in which few weeds appear. It is a low-growing grass, rarely over five inches high when in bloom. The flowers are in dense spikes of a brownish purple color. In periods of drought or of cool weather the leaves attain a distinct purple color, as is the case with crab grass, but in Java grass the color is more pronounced. The grass was introduced at Manila about 1908, and large patches of it show that it will there crowd out Bermuda grass and also Manila grass. At Miami, Florida, it has persisted for years and has spread in the lawns making large patches and crowding out other grasses. In Cuba it seems perfectly at home.

Java grass has not been tested for putting greens and it is hardly likely that it will prove as good as Bermuda. For fairways, however, it

should prove an excellent grass, as when once established it will continue to spread. The turf is very dense, but is inclined to be a little loose like short-mowed crab grass.

St. Augustine Grass (*Stenotaphrum secundatum*).—This is the rather coarse grass often used for lawns in Wilmington, Charleston, Savannah, and Florida. It is especially useful for its ability to grow in shade. No seed is available, so the grass is propagated vegetatively. It makes good fairway grass, as may be seen on many southern courses. The grass is naturally a seashore plant and will stand being overflowed by sea water without harm. This was clearly demonstrated on the course at Brunswick, Georgia, some years ago when a hugh tide overflowed the fairways. Carpet grass was entirely destroyed but the St. Augustine grass was unharmed.

Korean Lawn Grass (*Osterdamia japonica*).—This grass forms extremely tough sod and is probably the best of all for teeing grounds, besides making splendid fairway turf. At the Palm Beach Country Club are tees formed of this grass. The toughness of the sod is due to the rootstocks, each as large as a goose-quill. They form a layer beneath the soil often an inch thick, the rootstocks making a dense network. Seed is produced in Japan, but its entrance into the United States is prohibited, as it always carries an abundance of a fungous disease, an ergot, which might prove dangerous. Therefore its propagation will for the time being necessarily be by vegetative methods or by its natural spread from the seed produced.

Manila Grass (*Osterdamia matrella*).—This is closely related to the preceding grass and similar in habits, but the turf is much finer and very beautiful. It is the grass which covers the Luneta in Manila. The leaves are a trifle stiff, otherwise it would be an ideal putting green grass.

Centipede Grass (*Eremochloa ophiuroides*).—This is a common grass in China which makes up pastures and lawns. It is a very distinct plant, perhaps more resembling carpet grass than any other turf former. It spreads by creeping stolons which lie flat on the ground and grow about three feet long in a season. The grass is dwarf and rarely grows as high as six inches. During the first year it is rarely over 2 inches high. Centipede grass is beautifully adapted to the sandy soils of Florida, and even better to the clay soils of Cuba. For fairway purposes it will probably succeed in most tropical countries.

Blue Couch (*Digitaria didactyla*).—Blue couch is a native of Australia, not unlike fine Bermuda grass in appearance, but with a distinctly bluish cast. Its seed habits are not very good, so vegetative methods of propagation must ordinarily be employed. It shows marked ability to hold the ground against competitors, in Florida at least, and in some places spreads readily. In Miami are a few lawns of this grass which are very attractive. It probably is not superior to Bermuda grass for putting greens but seems fully equal to it.

Carabao Grass (*Paspalum conjugatum*).—This is a common turf grass of Central America and the West Indies, also found in Florida and Louisiana. It has been introduced and has become very abundant in Hawaii, where it is called Hilo grass, and in the Philippines, where it is called Carabao grass. It is much disliked by stockmen, as animals refuse to eat it. However, it makes excellent fairway turf, closely comparable to carpet grass in color and texture. There is considerable of it on the courses at New Orleans, some at Palm Beach, and it is rather plentiful on the Havana Country Club course. It prefers the moister ground. This grass is now wide-

spread in the tropics and may be expected to succeed wherever the moisture conditions are good. It should not be introduced into new localities, on account of its tendency to spread and to replace better pasture grasses. This grass has some tendency also to invade putting grens where it is not desirable.

Marvel (*Andropogon caricosus*).— This grass, native of India, where it is called marvel, was introduced by some means into Antigua about 1900. It spreads rapidly and adds to the herbage furnished by pastures. In fact, under many soil conditions this grass crowds out all others. Since 1900 it has spread to many of the islands of the West Indies. It was observed particularly at the Country Club of Havana. On rich land it will grow two to four feet high and will yield good crops of excellent hay. Where constantly pastured or mowed, the grass spreads by surface runners which root more or less at the joints. It makes rather coarse but fairly good turf. In general it behaves in the tropics about as crab grass does in midsummer at Washington, but unlike crab grass it is perennial and grows the year around unless drought is too severe. Marvel is a remarkable grass with astonishing ability to spread by its seed and to occupy the land. It is likely to be a valuable turf former in places where better grasses will not thrive.

Grama Grass (*Bouteloua americana*).—This grama grass is native and abundant in Cuba, and was observed particularly at the Country Club of Havana, where it is particularly valuable on the highest and driest parts, where the heavy soil is sometimes a bit gravelly. It is a perennial with much the habit of crab grass; that is, the branches radiate along the ground from the central crown, but do not root at the joints. The turf is therefore much like that of crab grass, not of the highest quality, but valuable because it makes a good ground cover on which most other grasses do not thrive. This grass has never been cultivated nor the seed handled in the trade. It is of interest and value where it occurs naturally, but probably not of sufficient value to justify its especial cultivation.

Weedy Plants.—On nearly every tropical golf course, turf-forming weeds make patches in the fairways. Some of them make really excellent turf, but probably none are really as desirable as grasses, unless the latter can be grown only with difficulty. Among these weedy plants are the following. *Meibomia triflora,* a very fine clover-like plant, native to India, now common everywhere in the tropics. The flowers are minute and purple and the small pods are jointed. It is common throughout Florida. *Lippia nodiflora;* this is used as a lawn plant in California, and it or similar species are widespread in warm countries. In Florida, Cuba and Louisiana great patches of it may be found in the fairways. *Dichondra Carolinensis;* this weed is a minute-flowered morning-glory in the South, and patches of it may be seen on the fairways and greens of most golf courses in that region. The leaves are kidney-shaped and the turf much like that of white clover. Patches of it may be 6 feet in diameter. *Alysicarpus vaginalis;* this plant is native to India, but is now found nearly everywhere in warm countries. It is a legume and makes patches of turf not unlike white clover, but the leaflets are single, not in threes as in clover. *Meibomia supina;* this is a legume native to Florida and Cuba. In fairways and lawns, patches of it may be found 12 feet in diameter. It spreads by creeping underground, and makes a very good turf.

GIVE US YOUR 1924 EXPERIENCE WITH BROWN-PATCH.

We are anxious to learn of your 1924 experience with brown-patch, both the large and small kind.

Please write us fully, giving us (1) the date or dates of appearance, (2) severity of attack, (3) measures used to combat, and particularly (4) the results you have gotten from any of the new fungicides.

It is planned to publish a full report on all the brown-patch data for 1924. Your cooperation is wanted in gathering information on which to base our report.

Getting Efficiency Out of Motor Equipment

By W. R. Hurd, 2d, United Shoe Machinery Athletic Association, Beverly, Mass.

We have been very much interested in motor equipment for cutting fairways and rough. We have 3 tractors, equipped with brakes and governors, and 2 fairway cutting units. One tractor is equipped with a bar cutting-attachment, for cutting the rough, and it is doing the work very satisfactorily and cheaply. We have standardized on a certain make of tractor with agencies throughout the country, and can thus always get service and repair parts when needed. Our problem here has never been one of service, so far as knowledge of the operation of gasoline motors is concerned, but rather ability to get spare parts promptly. There are usually plenty of good mechanics who understand gasoline motors as well as overhauling and repairing tractors, who have to work outside in the summer on account of their health, who are only too glad to get this kind of work and are employed as unskilled laborers at the topnotch unskilled labor wage. We believe that the main problem with regard to golf course equipment is always to have a spare unit irrespective of whether you need it or not. When it comes to a fairway cutting machine breaking down at the end of a rainy week, it means a course in very poor condition; and we all know how important Saturday and Sunday play is to the average golfer.

QUESTIONS AND ANSWERS

All questions sent to the Green Committee 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 Committee.

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. Results of Spiking Turf.—Our fairways, which are Bermuda, have become baked very hard. Our course is just entering into its second year and has been played over only since last July. It seems to us that the ground should be aerated, and we have tried to do this with several kinds

of harrows, but without any benefit to the fairways. We believe that a spiker is what we need, and will appreciate your advising us what you think of the use of a spiker on our fairways. (Georgia.)

ANSWER.—There has been much said about the spiking of bent and bluegrass turf in the North, and there are still some who think that this method has merit, but in most places, at least where it has been tried under properly checked conditions, it has been abandoned. We believe the condition of fairways can be benefited by top-dressing.

2. COVERING PUTTING GREENS IN WINTER.—Our greens did not winter very well last year, and we have about come to the conclusion to cover them this coming winter. As soon as the greens have frozen up, our plan is to cover them with a half-foot to a foot of good, clean straw, putting a little brush or something on to hold the straw in place. By using straw we thought that as the warm days came in the spring it might be fairly easy to roll off part of the straw, and yet with a sudden turn of cold weather, having straw on them, it would not be such a very long job to get some covering back. We feel that we can harden our grass more easily by using straw than by other materials. Our greens have recently (November) had our so-called "winter dressing" of bone meal and sand and are in rather good shape. We realize that a covering on the greens will not offset poor drainage. We still think, however, that we had some winter-kill where it was impossible for water or ice to stay on the green. Very early last spring we had two or three very warm days—rather record-breakers, which we think started the grass just enough to let it be caught by the very severe cold weather that followed. Now if this grass had had a covering of straw which would have hindered the early start a little, or if it had been protected a little by covering for the cold later, might not some of the grass have been saved? The considerations that induce us to propose the use of straw in place of other materials are that it could be easily put on or taken off a green quickly, it would not force the grass prematurely as manure might, it might be more free from weed seeds, and the straw could be easily cleaned up and would have no odor. What is your advice? (Massachusetts.)

ANSWER.—In Minneapolis they have had experience with endeavoring to protect greens from winter cold by covering them. In the first winter of the trials they thought the results were good; in the second winter of the trials the results were decidedly bad, the greens suffering much more than those left exposed. It is well to remember that where grass is protected by a thin covering of straw or brush it will start growth early in the spring, and if the brush is removed at that time a subsequent freeze may kill some of the grass. This can probably happen under normal conditions; that is, a spell of unusually warm weather followed by a heavy freeze may result in some killing of the grass. This is clearly a possibility and not unlikely occurs, although we have no direct proof except the experiences one year at Minneapolis. If the straw or brush is put on too thickly the grass will be killed by smothering. In the light of our present knowledge, the protection of putting greens by such artificial covering can not be recommended. We think it might be well to watch the greens through the winter, particularly to see that no great snowbanks accumulate on any green, as during the melting of these snowbanks the ground at the base becomes soggy, and then a freeze will do much damage. We are very

positive that the most important thing of all is to have the greens well drained and keep them well drained, even from such incidental things as accumulations of snowbanks.

.3. TOP-DRESSING BERMUDA GREENS WITH BARNYARD MANURE.—We have been in the habit of buying barnyard manure every year and letting it stand for two years, and then screening it and mixing it with sand and using it as a top-dressing. We have put this on our Bermuda greens about the first of each year, after closing our regular greens, and have let the greens stand idle until about the 15th of May, when the Bermuda starts to come through. Personally I feel that this is useless and an extra expense as a winter practice. Would it not be better to save this dressing until the Bermuda starts to grow in the spring? I also believe that the manure we are using is not old enough nor well enough rotted. Do you think we would get better results from the use of humus as a top-dressing than from the use of manure? (Tennessee.)

ANSWER.—Well-rotted barnyard manure is excellent for use as a top-dressing even if it is only one year old; it will however continue to get better if permitted to rot for several years. The best method of rotting it is the use of compost beds, as described in THE BULLETIN, Vol. I, (1921), page 52. This material can be used as a top-dressing on Bermuda greens any time during the winter or in early spring before the Bermuda begins to grow. If the material is well rotted the best time to use it would be just before the Bermuda begins to grow. If the manure is, however, relatively fresh it would be safe to apply it to the greens at any time during the winter, as it gets washed into the soil, and any straw or other material remaining can be raked off in the spring. As regards humus, if you mean the commercial material, we would advise you to let it alone absolutely. It looks like good stuff but, practically speaking, in most cases is worthless if not harmful.

4. RIDDING COMPOST OF WEED SEEDS BY HEATING OR OTHERWISE.—Our experience with compost as a top-dressing leads us to believe that a large part of our weed trouble is due to weed seeds which are introduced with the compost. In order to rid our compost of these weed seeds it has been suggested to us to bake the compost in a pan over a fire or to treat it with live steam. Is this procedure practicable? Is there not danger of destroying the effectivity of the plant food in the compost when it is thus heated? (Massachusetts.)

ANSWER.—While considerable has been written and said with regard to the killing of weed seeds in soil, no very satisfactory means of accomplishing this purpose have come to our attention. We are experimenting on the treatment of compost with a liquid or gaseous substance which will kill the weed seeds contained but which will not injure the compost. As for the introduction of weeds through the use of compost, we are inclined to think that the danger of this is being exaggerated. It is true that weeds are generally found growing in abundance on compost piles but these weeds for the most part are not such as are likely to be troublesome on putting greens or fairways under continuous mowing. Furthermore, quite carefully conducted experiments indicate that where heat is spontaneously generated in manure piles, practically all the weed seeds contained are killed within a year or less. It is also true that if you could

apply compost absolutely free from live weed seeds, you would still have weed troubles, and many of them, and we are therefore not at all sure that applications of compost are responsible for any considerable percentage of weed troubles. It is practically out of the question to have first-class putting green turf without the use of compost, and we do not think you need fear using any kind of manure or similar organic matter in your compost piles. If you have to use manure which is not thoroughly rotted and contains a good deal of straw or similar vegetable matter, the decomposition of this vegetable matter can be speeded up by the addition of ammonium sulfate at the rate of about 100 pounds of ammonium sulfate to 1 ton of dry organic matter. As manure, however, generally contains a rather high percentage of water, it will require probably several tons of manure to represent a single ton of organic matter which is absolutely dry, varying with the percentage of water the manure contains.

5. Fertilizers for Bermuda Grass; Possible Effect of Lime on Bermuda Grass.—I notice you advise against the use of lime on golf turf. Does not ammonium sulfate create an acid condition of the soil, and does not Bermuda thrive better in an alkaline or neutral soil? (Louisiana.)

Answer.—There is some evidence that lime is beneficial rather than otherwise to Bermuda grass, which is not the case with bent and fescue turf. Nevertheless, Bermuda grass will stand a considerable degree of acidity. We are not in a position to say just what the reaction of the soil should be to get the best Bermuda turf—that is, whether it should be alkaline, neutral, or acid; but the indications are that its reaction to this fertilizer is not particularly delicate. It would be very interesting if next spring you could take a portion of one of your putting greens and treat it with lime and then note whether any beneficial results follow. In general we are afraid of lime, because regardless of its other effects it certainly nearly always encourages weeds, which are expensive things to handle on putting greens. In the light of our present knowledge we would advise you to stick to ammonium sulfate; it is a splendid fertilizer, and we doubt if it would produce an acid condition deleterious to Bermuda grass, and it certainly will discourage a lot of weeds.

6. Grasses for Florida Locations Near Salt Water.—We are building a golf course near salt water and should like to know what grass you consider best suited for such conditions. (Florida.)

Answer.—For your fairways Bermuda grass, which will stand considerable salt water, will probably be the best grass to use. If, however, you should have difficulty with it, we suggest you try Joe Jointer grass, also called Seminole grass, which is a native grass common in low places in your location; it looks much like Bermuda grass, but its runners are more fleshy. For your putting greens use Bermuda grass. There are many strains of Bermuda grass, but the Arizona seed contains a considerable percentage of the finest strain of Bermuda grass of which we know, and which we call Atlanta Bermuda grass. You could be sure to obtain a pure turf of Atlanta Bermuda grass by starting a nursery of it with runners.

7. Playing on Permanent Greens During Winter.—What is your opinion of using permanent greens during the early winter months? I

have always been of the opinion that temporary greens should be used at that time. During the month of December, when we have a fair amount of play, we get quite a few warm days, and I have always thought that playing on those days is very harmful to the greens. (Michigan.)

ANSWER.—Our conclusion, based on long observation, is that it does not injure the greens at all to play on them in the winter, provided care be taken not to play on them when the ground is frozen or when it is soggy from alternate freezing and thawing. The clubs here at Washington play on their putting greens all winter except when the ground is under the condition we have mentioned.

8. SEEDING AND FERTILIZING NEW PUTTING GREENS IN THE NORTH.—Which is the best and most suitable grass seed to purchase for this section of the country for seeding a new putting green? How much seed is needed for a green of 4,000 square feet? Which is the best fertilizer, and how much would be needed for the above green? (New York.)

ANSWER.—Undoubtedly the best seed for your purposes is South German mixed bent seed. On well-prepared ground, bent seed should be sown at the rate of 3 to 5 pounds per 1,000 square feet of surface. The best time to do this is about the first of September. The fertilizing of putting greens can be entirely controlled from the top, and this is the best plan to pursue. In the original preparation of the soil a small amount of barnyard manure should be used, which is the best of all fertilizers for the purpose. After the grass is established it may be top-dressed occasionally with good compost; this is necessary not only to keep the grass in proper vigor but also to smooth out inequalities of the surface. Apart from compost the only fertilizer you should use is ammonium sulfate, the use of which has been fully discussed in THE BULLETIN.

9. COMPARATIVE RESISTANCE TO BROWN-PATCH OF CREEPING BENT PRODUCED FROM SEED AND THAT PRODUCED FROM STOLONS.—Some of the finest greens that I have seen recently were planted a couple of years ago by the vegetative method, and yet in spite of this we have received advice from other golf clubs that we had better sow our new greens with seed than plant them from stolons, the point being made that the greens planted from stolons will be subject to brown-patch. Which kind of green is more subject to the disease, the seed or the vegetative green? (Connecticut.)

ANSWER.—Creeping bent greens planted with stolons are no more liable to injury from brown-patch than are creeping bent greens produced from seed. In fact, some strains of creeping bent are found to be more resistant to brown-patch than are other strains, and when stolons of these more resistant strains are used in planting a green less injury from brown-patch may be expected than if the greens are seeded.

10. USE OF POULTRY MANURE IN COMPOST.—There is a large quantity of poultry manure available to us. Do you consider this material good for making compost for top-dressing greens? (Illinois.)

ANSWER.—We have obtained very good results with poultry manure. If you are going to make a quick compost with it we would advise you to use it in the proportion of 10 pounds of finely-ground poultry manure to 100 pounds of good top soil, and to apply it after the two have been thoroughly mixed.

Meditations of a Peripatetic Golfer

Evergreens in mixed clumps of trees. They look beautiful in winter.

Planting a whole golf course to stolons by machinery! Wonders will never stop ceasing, as Mrs. Partington remarked. See the illustration in this Bulletin.

A home-made golf course with old tomato cans for cups! Why not if the dollars are scarce?

To determine the best culture methods, the agronomist uses almost purely empirical tests and draws deductions and conclusions. The chemist and the botanist tend to draw inductions based on one or more factors. Factors are so complex and so numerous that the second method is more apt to be misleading than to be sound. Induction theory is a dangerous method as regards plant culture and that includes turf. Don't let it kid you.

We have recently read an interesting article on "The mating habits of Lumbricus terrestris or why earthworms have large families." Apparently the learned writer did not realize that the main object of the worms is to worry the golf players.

The fact that most golf courses are mediocre or worse, means a lot of work for good golf architects in the future.

Every green committee should constantly aim to keep the turf as nearly perfect as possible; to work continuously to improve the landscape beauty; to provide for the birds; to improve the golf architecture whenever desirable; to avoid wasteful expenditure.

If you have to bury or cover rocks on the golf course, have at least two feet of soil over the top. Otherwise the turf will burn in dry weather. Sheep's fescue is the best grass to use.

If you intend to build a new golf course, consult first of all with intelligent men who have had experience. It is foolish not to avoid the mistakes the other fellows have made.