

or greenkeeper who has not seen it and had the various phases of the work there explained to him.

There are probably many greenkeepers who would like to attend this meeting but do not feel that they would be justified in bearing the expense of the trip here. In such case it will be to the advantage of the clubs to pay their greenkeeper's expenses and send him on, as there is no doubt that money spent in this manner will be a profitable investment for the club that takes advantage of giving its greenkeeper the information available at a meeting of this kind.

A Green Section meeting will be held in Washington on Monday, August 29. Visitors will be guests of the Green Section for the day. Headquarters will be at the Hotel Hamilton, 14th and K Sts., N. W. To complete the program as scheduled it will be necessary to leave the hotel for Arlington promptly at 9 a. m. Be sure to tell us that you are coming.

## Brown Patch Immunity?

By R. H. Patterson

The question of immunity to brown-patch in creeping-bent turf may well be approached with trepidation and misgiving lest one's reputation for veracity suffer the rebuke of Ananias before Peter. If anyone believes he has discovered a species of creeping bent immune to brown-patch he has thus far held his peace. However, in what follows the "discovery" is subject to the usual limits and qualifying considerations of time, place, and the human equation. Furthermore, like many another thing in nature's garden, there are certain irreconcilable ambiguities in the history of the particular piece of turf in question which leave one's conclusions like a lost ball in the rough.

In the early fall of 1922, through the kindness of the late Professor Piper, the writer obtained approximately a square foot of bent turf of a strain with which the Professor had been experimenting since 1916. In the fall of that year he had four selections of creeping-bent turf from the Columbia Country Club, at Chevy Chase, Md. These selections were planted in a nursery at Arlington and tested out under turf conditions. All except one, marked "No. 1 Selection," which is officially known as No. 02529, United States Department of Agriculture, failed to produce a satisfactory turf and were later discarded. In the meantime, however, No. 9 green at East Potomac Park had been planted to one of these strains in 1918. This green was severely attacked by brown-patch in 1919 and practically killed out.

In 1919, No. 9 green at Columbia was planted to stolons grown from Professor Piper's No. 1 selection and has proved very resistant to brown-patch ever since. This strain has also produced a satisfactory turf at the Arlington Turf Gardens, but has been rather susceptible to the fungus; in fact, much more so than at Columbia, and decidedly more so than either the Washington or Metropolitan strain at Arlington.

The square foot of turf received from Professor Piper was shredded and planted in September, 1922, in nursery rows 3 feet

apart to a total of about 80 linear feet. The ground selected was the old No. 15 green of the Homestead course at Hot Springs, Va. The soil was poor, as the green had been skinned of turf and most of its topsoil several years previous when the site was changed. The only additional humus the stolons received was contained in the topdressing, and no fertilizer was applied until March, 1923, when a very light application of sand and nitrate of soda was given. However, by June of that year the stolons had matted together and the whole bed was taken up, shredded, and replanted to nursery rows, which this time occupied nearly half the area of the old green. Again the only additional humus material consisted of the topdressing with a light application of nitrate of soda two or three weeks later. In 1924 we began to use ammonium sulfate, though very sparingly. Occasional weeding kept the nursery fairly free



of undesirables and, though in the press of other work the bent garden was neglected like the proverbial stepchild, it grew and flourished, and in the summer of 1925 provided an abundance of stolons for planting the new No. 15 green when it was again resited.

In the construction of this green certain conclusions, drawn from recent experiences, were put in practice. For instance, it was noted that the most heavily manured greens at Cascades, just completed near by, were beginning to show evidences of brown-patch, particularly those whose subsoil was a stiff, impervious clay; whereas greens in which a minimum amount of manure had been used were practically free from the fungus. Another feature peculiar to the former type of green was the broad, lush leaf and thick ligule of the creepers, while on the latter the turf was of a much finer texture.

The rapid development of the nursery on comparatively poor soil and short rations, together with its absolute freedom from brown-patch, urged the writer to construct the new No. 15 of the

Homestead course with the minimum amount of manure (about 8 cubic yards to 8,100 square feet of surface) and the maximum amount of a naturally rich topsoil and clean, sharp sand. The subsoil was a light, pervious clay screened to a depth of 6 inches and carefully surfaced to conform to the finished surface of the green. Light topdressings of equal parts of screened sand and topsoil with 3 to 5 pounds of ammonium sulfate were applied at intervals of two weeks after growth had been established. The green surface was kept moist throughout the initial growing period. Close cutting was the rule at all times.

No. 15 is perhaps the finest green of the 45 at Hot Springs, and at no time since 1922 has the turf with which it was planted shown the slightest trace of brown-patch, despite the fact that the



fungus has been quite prevalent near by, even attacking the bluegrass in certain areas. The turf is a rich, bright green in color, fine-leaved and slim of ligule, a hardy and truly patrician type of creeping bent, providing a putting surface of the utmost desirability. Within the limits of the writer's knowledge, no preventive measure of any sort has been used to protect it against brown-patch.

The conclusions drawn from the apparent immunity of this turf to the inroads of the mycelium are: First, that it was derived from stock showing a peculiar resistance to brown-patch; second, that it was propagated under soil conditions unfavorable to the production of the fungus; third, that in so far as was practicable these conditions were reproduced and perpetuated in the construction of the present No. 15 green. Finally, however, the instance in which it proved susceptible at Arlington nullifies any broad general claim to possible immunity and accentuates the probability of the local nature of the case. Unnumbered combinations of soil and climatic conditions and specific local influences operate to form in each a more or less separate and individual problem; so that it is perhaps more localized than general. Hence it behooves each club to seek and determine the strain best adapted to its peculiar conditions and to propagate that strain in its own nursery. An ample turf garden should be regarded as the most important adjunct of every well-managed golf course.

Only an exhaustive study and analysis of the whole matter can determine the underlying truths, and it is hoped that the Research

Committee of the Green Section, to whom the writer is indebted for the preliminary data on this turf, will undertake the solution. Few elements of research are of more fundamental importance to the golf world; for though substantial progress has been made in the treatment and control of brown-patch, it comes like a thief in the night to despoil and discourage the best efforts of the green keeper.

## Golf Course Architecture and Construction

### Selecting the Property

By William S. Flynn

The selection of the property for a golf course is a most important matter. Often the question is asked how much ground is needed for an 18-hole layout and what type of terrain makes the best course. There is really no specific rule as to the total acreage required. Eighteen-hole courses have been laid out on as few as 80 acres or even less, while others have taken as much as 200 acres, and in some instances more have been utilized to advantage. The necessary acreage depends primarily on the availability of the property for golf-course purposes.

In hilly country a great deal more ground is usually required than in gently undulating or more or less flat country. This is due to the fact that it is imperative to make the climbs easy, using the steeper slopes for downhill play and the lesser grades for uphill play wherever possible.

It naturally follows that in planning a course along these lines considerable ground must be wasted, as in very hilly country there are sure to be slopes so precipitous they can not be worked in at all.

When a portion of the property to be had is low, and it is hard to find a piece of land large enough for a golf course that has no low-lying sections, intricate drainage problems are presented, and it is sometimes wiser to pass up the swampy areas entirely and use other and higher ground that can be put in playing shape at a much lower cost of construction and afterwards maintained more economically. This also would have a bearing on total acreage requirements.

While fine golf courses have been laid out over all kinds of country, hilly, flat, and gently undulating, the latter type is, generally speaking, the best suited for the design and construction of a really good course.

After all, the science of golf architecture is the presenting of problems and the placing of objectives to be reached by the players and an objective that is 10 feet above or below him is practically as formidable as one 30 feet above or below.

And the great mass of average players, the men who support the game, must be considered, because it is more or less of a hardship for them to tramp, month in and month out, over severely undulating country. For, after all is said and done, most everybody who plays the game does so for the pleasure they get out of it, not for the exercise, no matter how loudly they may emphasize the lure of its health-producing qualities.

Then in gently undulating country much better visibility can usually be obtained, and visibility is much to be desired, particularly on the shot to the green. Also the maintenance problems are, as a rule, more simple on this kind of terrain.