

such. This work may well be compared with the experimental work in the automobile business. Before being adopted, the improvements in engines and body parts are worked out by engineers and mechanics in experimental laboratories and on machines quite different from the highly polished and be-cushioned product of the show window or boulevard.

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## Demonstration Turf Gardens on Golf Courses

By John Monteith, Jr.

During the season of 1928 the Green Section established 15 new demonstration turf gardens on golf courses in different sections of the country. These will be supported and cared for by the local clubs, under the direction of the United States Golf Association Green Section.

It has been recognized for a long time that soil and climatic conditions exert such important influences on plant growth that recommendations based on tests in one locality may need modification under somewhat different local conditions. This has been found to be true in growing most plants, and as a result the State agricultural experiment stations and the United States Department of Agriculture have established many branch stations throughout the agricultural districts. The purpose of these new demonstration turf gardens is to extend the Green Section experimental work by providing a series of plots near several golf course centers. There it will be possible to reproduce under various local conditions some of the most promising experimental work of the turf gardens at the Arlington Experiment Farm and a few of the State experiment stations where golf turf work is under way. These series of plots are distributed as follows:

Minneapolis:	Interlachen Country Club.
Chicago:	Olympia Fields Country Club.
Grand Rapids:	Municipal.
Detroit:	Detroit Golf Club.
	Lochnoor Club.
	Meadowbrook Country Club.
Pittsburgh:	Oakmont Country Club.
	Allegheny Country Club.
Boston:	Charles River Country Club.
Metropolitan District:	Morris County Golf Club.
	Upper Montclair Country Club.
	Wheatley Hills Golf Club.
	Century Golf Club.
Atlantic City:	Country Club.
Richmond:	Country Club of Virginia.

Similar plantings have been made on the grounds of the Agricultural Experiment Station, Amherst, Mass., and on the campus of Leland Stanford Jr. University, Palo Alto, Calif.

Each series consists of 55 plots, each 10 by 10 feet, requiring an area for the complete set of 50 by 110 feet. It is recognized that there are several objections to small plots, but these objections are overcome by the advantages of lower cost, more uniform soil conditions, and more direct comparisons. These plots are all numbered and are planted in practically the same order in every locality. The arrangement is such as to bring together the plots that will be most interesting for comparison and also to condense into a small series

as many of the interesting features of experimental work as can be arranged. This is done also with the view to simplifying the plan in order that the plots may be cared for with least expense and with the least possibility of confusion.

The 55 plots are arranged 5 plots in width and 11 in length. The 5 plots at one end are designated as optional plots, in which tests are to be made of different grasses or fertilizers which are of more restricted local interest. In some cases this set is being increased to provide more room for testing out local strains of bent or various soil mixtures, as well as fertilizers. Ten of the plots are used for testing various putting green grasses. In some cases these plots have been divided so that a plot may be planted with two grasses, or with the same grass from seed originating in different regions. In this



The demonstration plots at the Country Club of Atlantic City

group there is a comparison of red fescue, Chewing's fescue, annual bluegrass (*Poa annua*), Rhode Island bent grown in three different localities, German mixed bent, seaside bent, velvet bent (both from seed and vegetative planting), and four strains of creeping bent planted by the stolon method. It is planned to keep these plots mowed at putting green length, and all will receive the same fertilizing, watering, cutting, and other treatments. This group will give anyone an opportunity to compare the various grasses commonly used on putting greens as grown under identical conditions without the usual variation in soil and treatment, which is found when one tries to compare turf on two or more different putting greens.

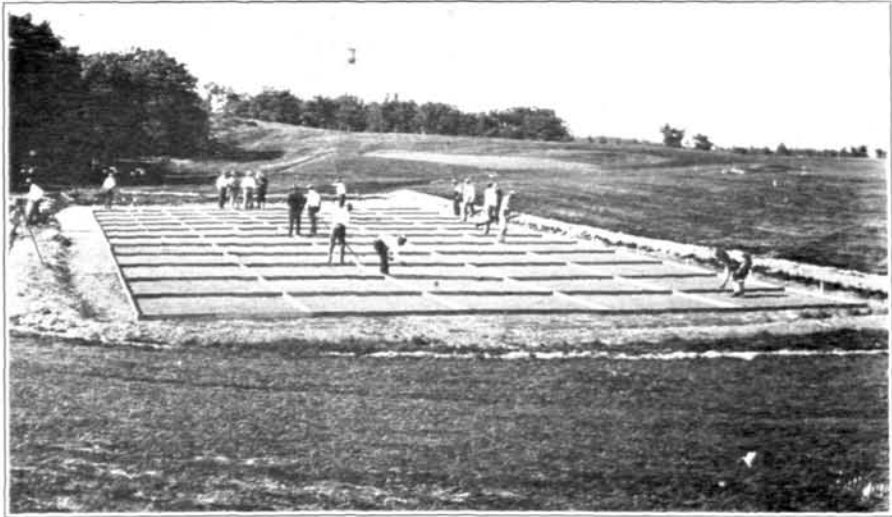
Fifteen plots will be devoted to experiments with various fertilizers, both organic and inorganic. Four of these 15 will be used as checks and will receive no fertilizer whatever. Each plot will receive one fertilizer, and none other, over a period of years. The check plots are so arranged that each of the fertilizer treatments will have one side adjoining an unfertilized piece of turf. One can then stand in the center of this area and within a distance of 30 feet can see the response of turf to 11 different fertilizer combinations. Since nitrogen is such an important factor in turf production, these fertilizers

PLAN OF DEMONSTRATION TURF GARDENS

	A	B	C	D	E	
1						Optional.
2	Red fescue. Chewing's fescue.	Washington. Metro-politan.	R. I. bent Wash. grown. Colonial bent.	R. I. bent.	Velvet bent seed.	Trial plots of putting green grasses.
3	Annual bluegrass.	Virginia. Columbia.	Seaside bent.	German mixed bent.	Velvet bent stolons.	
4	Sewage sludge.	Poultry manure tankage.	Check.	Sulphate of ammonia.	Compost and sulphate of ammonia.	
5	Check.	Nitrate of soda.	Urea.	Phosphate of ammonia.	Check.	Fertilizer experiments on putting green grass (seeded German mixed bent).
6	Complete fertilizer 6-12-4.	Complete fertilizer 12-6-4.	Check.	Lime and sulphate of ammonia.	Bone meal.	
7	German mixed bent.	German mixed bent.	German mixed bent.	Metro. bent stolons.	Chewing's fescue.	
8	Ky. blue and redtop.	Ky. blue and redtop.	Ky. blue, redtop and Ger. mixed bent.	Ky. blue and redtop.	Chewing's fescue and Ger. mixed bent.	Fairway length. } Cutting experiments
9	Ky. blue, redtop and Chewing's fescue.	Ky. blue and redtop.	Ky. blue, redtop and Ger. mixed bent.	R. I. bent.	Chewing's fescue and Ger. mixed bent.	
10	Bone meal.	Lime.	Check.	Sulphate of ammonia.	Sewage sludge.	Trial plots of fairway grasses.
11	Check.	Manure.	Complete fertilizer 6-12-4.	Complete fertilizer 12-6-4.	Check.	

<sup>1</sup> Soil in plots 7A and 8A poisoned with arsenate of lead before seeding.

will be applied at rates which will give the same amount of nitrogen for each plot, with the exception of the 4 check plots and one other which will receive no nitrogen. It is planned that the fertilizers will be weighed accurately and distributed by the Green Section, to be applied by those in charge of the individual plantings. No fertilizer was added before planting, and soil was selected so that the turf in each case starts out evenly. After the grass has become established, fertilizers are to be applied at certain intervals. The grass used in this fertilizer group is German mixed bent, since this will give an opportunity to observe the response of the several different bents in the mixture rather than one particular species or strain of grass.



Planting one of the Green Section's series of demonstration plots on the course of the Interlachen Country Club. The planting was done by the local greenkeepers' association

In the two plots below the fertilizer series there is a test of the effect of arsenate of lead in the soil on German mixed bent. Both of these plots are seeded with the same amount of seed from the same bag. Everything else is equal, with the exception that the soil on one of the two plots was treated with arsenate of lead at the rate of 5 pounds to 1,000 square feet. These two plots will serve to indicate the value of arsenate of lead in controlling earthworms, weeds, and grubs under local soil conditions.

In three plots there is to be a test of the influence of cutting putting greens at different heights. One of these plots is of mixed bent seed, another is planted with creeping bent stolons, and another with fescue. One-half of each plot will be cut with the mower set low and the other half of each will be cut with the mower set high for putting greens. It is hoped that this series will throw some light on the question of the most desirable height for cutting these three different types of putting green turf.

The remaining 20 plots are to be devoted to fairway experiments. Five plots are used for different grasses or mixtures commonly used for fairway turf. Ten plots, planted with a mixture of Kentucky

bluegrass and redtop, are used for testing fertilizers. Three of these 10 will be used as check plots without any fertilizer, and the others will receive periodic applications of different fertilizers in a manner similar to that outlined above in the fertilizer series on putting greens. Two plots will be used for testing the effect of arsenate of lead on fairways in a manner similar to the test on putting greens. For this test a mixture of Kentucky bluegrass and redtop is used. Three plots are devoted to tests of the most desirable height for cutting fairway turf. Three different mixtures are used, including Kentucky bluegrass, redtop, German mixed bent, and fescue.



Finishing the planting of the demonstration plots on the course of the Country Club of Virginia, at Richmond

In most cases it has been possible to obtain seed from the same source to provide for planting all of these different series. Therefore, if the fescue, for instance, fails in one locality and thrives in another, it will indicate that the difference was due to local conditions rather than seed differences, since both were planted from the same bag of seed.

In most cases the demonstration will be placed under the direct care of a practical greenkeeper and the work on the plots will be done by the regular golf course staff. This will probably serve to remove some of the "mystery" in which individuals try to enshroud some of the experimental work done by the Green Section or experiment stations.

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Hazards should be visible. They should not be so severe as to discourage bold play. In general, they should not penalize to the extent of more than one stroke.

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"A tee is almost as important as a green. If the tees on a course are kept in good shape one may be sure to find the greens well cared for; they are unfailling barometers, as it were."—Walter J. Travis.