



Preparing to apply fertilizers on one of the U. S. G. A. Green Section demonstration turf gardens. The bags of fertilizers are placed in the plots indicated by tags and checked to avoid errors. Pieces of board are placed under each bag to keep it off the moist sod. A wooden frame is placed around the plot as the fertilizer is spread in order to confine it to the designated plot.

# Fairway Fertilizers Rated at Demonstration Gardens

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**T**HE demonstration turf gardens which were described in June GOLFDOM contained a series of plots in which the value of various fertilizers were compared on fairway turf. The grass used in the fairway series was a mixture of 80 per cent Kentucky bluegrass and 20 per cent of redtop. The purpose of this set of plots was to determine the relative values of certain fertilizers in establishing and maintaining a stand of Kentucky bluegrass and redtop. Because of the small size of the demonstration gardens' it was necessary to limit the number of fertilizers to a few representative types which would serve merely as an indication of what might be expected from closely related fertilizers. The reports of the ratings as listed in the accompanying table are from a large number of gardens in different parts of the country and therefore the figures have considerable value as representing the average results that may be expected from the fertilizers tested.

Areas on the gardens set aside for the

fairway fertilizer tests were mowed in much the same manner as were the fairways on the courses on which the gardens were located. In most of the gardens the fairway section was not watered, but where the gardens were located on courses where fairways were watered regularly the fairway section on the demonstration gardens was likewise watered. As shown in the plan of the garden on page 17 of June GOLFDOM, the fertilizer series was so arranged that each fertilized plot was adjacent to a check plot which received no fertilizer. These check plots served to show what type of turf could be produced on each soil without the addition of any plant food elements. The fertilized and unfertilized plots were all planted at the same time and therefore the difference in rating between the fertilized and check plots represent the degree of improvement due to the fertilizers.

As originally planned the gardens contained only 11 rows of plots, two of which were devoted to the fairway fertilizing

TABLE I  
Fairway Fertilizer Ratings on Mixed Turf of Kentucky Bluegrass and  
Redtop on Green Section Demonstration Gardens

	1929	1930	1931	1932	1933	5 Years' Average
6-12-4.....	78	69	62	68	69	69
12-6-4.....	74	62	60	66	67	66
Activated sludge.....	62	63	64	66	69	65
Bone meal .....	60	61	61	66	66	63
Sulphate of ammonia.....	65	58	52	55	56	57
Manure .....	51	49	50	49	54	51
Lime .....	45	48	48	51	54	49
Check 10-C (no fertilizer).....	40	44	47	44	46	44
Check 11-E (no fertilizer).....	41	42	44	39	41	41
Check 11-A (no fertilizer).....	44	40	45	37	35	40

ests. The immediate improvement due to the addition of complete fertilizers created more interest in this series of plots than had been anticipated and there was a demand for additional combinations of fertilizing elements; therefore, another row of 5 plots was added to the series and was gladly planted on practically all of the gardens.

The additional row was planted after most of the gardens had been in operation for at least two years. The results in the new row, therefore, represent a response from younger turf than in the older series; consequently these results are represented in a table separate from those of the older series of 10 plots.

#### Fairway and Green Tests Differ

As in the putting green series the fertilizers containing nitrogen were applied at rates that provided equal amounts of nitrogen to each plot. During 1929 the quantity of nitrogen for each plot was the same as that used for the putting green fertilizers. Later this was reduced so that each fertilized plot in the fairway series received half the nitrogen that was applied to the different plots in the putting green series. The applications on the fairway plots were made in the spring and early fall, whereas the putting green plots were fertilized throughout the summer months.

The highest average ratings for the five years as shown in Table I were given to the two complete inorganic fertilizers. These are the same fertilizers which headed the list of putting green fertilizers in the table on page 12 of July GOLFDOM.

The two complete mixed fertilizers used in this series were of the same composition as those used in the putting green plots. They contained sulphate of ammonia, phosphate of ammonia, superphos-

phate, muriate of potash and sand. The sand was used merely as an inert filler to provide the proper proportions. No organic material was used in their preparation. It is interesting to note that in the fairway series there was a little more difference in favor of the 6-12-4 as compared with the 12-6-4 than was the case in the putting green series. In order to provide the same amount of nitrogen for each plot it was necessary to use two pounds of the 6-12-4 fertilizer for every pound of the 12-6-4 fertilizer. Therefore, the plot receiving the 6-12-4 fertilizer was given four times as much phosphoric acid and twice as much potash as was put on the 12-6-4 plot. Since the nitrogen was alike in each plot and the materials used in the preparation of these two fertilizers was the same, it is apparent that the difference was due to the different amounts of phosphoric acid and potash.

#### Consider Cost Factors

In comparing these two leading fertilizers from the standpoint of cost, the table would indicate that in the big majority of cases the 12-6-4 combination would be preferable to the 6-12-4. In planning the gardens no attempt was made to make comparisons on the cost basis because of the variations in prices in different sections. In general it will be found that a ton of 12-6-4 fertilizer will be more expensive than the 6-12-4 fertilizer, but by no means double its cost. Since the 6-12-4 fertilizer in these tests was used at double the rate of the 12-6-4, any application on a similar basis will be distinctly in favor of the 12-6-4 from a cost standpoint. The small difference of 3 points in the 5-year average will hardly justify the greater cost of the application of the 6-12-4 fertilizer except in soils that are especially deficient in phosphoric acid or potash.

The two organic fertilizers, activated sludge and bone meal, place somewhat below the two leading inorganic fertilizers. In the case of the activated sludge it is interesting to note the gradual improvement over the 5-year period from 62 per cent to 69 per cent. The bone meal shows a similar improvement, though not at the same even steps. This evidence of gradual improvement simply adds further evidence to show that the value of fertilizers should not be judged too hastily, and it also indicates the need for continuing tests of this type over long periods in order to show the possibilities of harmful or beneficial accumulations in the soil from many materials repeatedly applied to turf.

A comparison of the figures in Table I shows the striking difference in response of turf to the two leading inorganic fertilizers and the leading organic fertilizers during the first year. The inorganic fertilizers produced a covering of new turf much more rapidly than did the organic fertilizers. After the first year the ratings of the organic fertilizers were close to those of the leading inorganic fertilizers. These figures point to the desirability of using the quickly available inorganic fertilizers at planting time in order to obtain a good turf most rapidly. It should be remembered that during 1929 twice as much nitrogen was used in all of the plots as was used in subsequent years. This accounts for the decided falling off in the ratings of the inorganic fertilizers the second year. In the case of the organic fertilizers some of the unavailable portion was left as a residue to supplement the lighter applications of the second and subsequent years.

The sulphate of ammonia plot rated well below the complete inorganic fertilizers in each of the five years. It is interesting to compare the figures given for this plot with those of the two leading inorganic fertilizers in which a large proportion of the nitrogen was obtained from sulphate of ammonia. These figures indicate the importance of phosphoric acid and potash in producing good fairway turf. It is also interesting to compare these ratings with the ratings in the putting green series in the July GOLFDOM. The figures for the 5-year average indicate that in the fairway fertilizer series the 6-12-4 led the sulphate of ammonia by a margin of 12 per cent. On the putting green series, however, during the same period the 6-12-4 led the sul-

phate of ammonia by a margin of 6 per cent.

The manure for these tests was not supplied by the Green Section with the other fertilizers. The instructions were to apply a definite amount of well-rotted manure to the plot at the time when the other plots were fertilized. Undoubtedly there were decided variations in the composition of the manure that was used in the different gardens. However, it can be assumed that the average amount of nitrogen added in the various gardens was very close to the amount applied to the other fertilized plots. The figure in the table indicates the relatively small improvements from manure as compared with some of the leading fertilizers.

The plot which received lime alone received a better rating than the check plots, but was 20 points below the leading plot and only 9 points better than the poorest plot in the series. This plot, like the activated sludge and bone meal plots, showed a gradual improvement over the five-year period.

The check plots in the fairway fertilizer series showed a greater variation in the ratings, particularly in the last two years, than did the check plots in the putting green fertilizer series. The ratings of the check plots serve as an indication of the possible variations in the ratings of the individual plots even without any influence of fertilizers. Therefore, any minor differences of a few points in the table must be ignored as due possibly to variations in the soil as indicated in the check plots.

### Series of Newer Tests

Table II contains figures from the set of five plots that was added to the fairway fertilizer series. Since this group of plots was planted well after the gardens were planted, records for only two years are available.

In the table it will be observed that the check plot received an average rating for the two years of 38 per cent. This is lower than the average ratings for the check plots shown in Table I; therefore, the ratings of the other plots in this series can be expected to be lower than the ratings might have been had these plots been included in the original planting and averaged over a period of five years.

The series included a comparison of the combinations of lime, phosphoric acid and potash. In all four fertilized plots the nitrogen was constant. The 6-12-0 fer-

TABLE II

Fairway Fertilizer Ratings on Mixed Turf of Kentucky Bluegrass and Redtop on Green Section Demonstration Gardens

	1932	1933	2 Years' Average
			%
Lime plus 6-12-0.....	63	70	66
6-12-0 .....	55	55	55
Lime plus 6-0-4.....	53	53	53
6-0-4 .....	50	47	48
Check 12-C .....	36	40	38

tizer contained the same materials as the 12-6-4 except that muriate of potash was left out. The 6-0-4 fertilizer contained sulphate of ammonia and muriate of potash in the proportion indicated. The addition of lime to the nitrogen with phosphoric acid combination (6-12-0) improved the rating by 11 points during the two-year average. On the other hand, supplementing nitrogen with both lime and potash did not give as good results as did the combination of nitrogen and phosphoric acid. The inclusion of lime raised the ratings of

either the combinations of nitrogen with phosphoric acid or nitrogen with potash.

The results of Table II can be compared only roughly with Table I because of the difference in age. The chief purpose of this new series was to compare them with the plots shown in Table I at the same age. In the demonstration gardens that were planted in 1931 and thereafter it is possible to make a direct comparison of these various combinations. Such a comparison, however, will be left until reports over a longer period can be assembled.

### Summer Tournaments Indicate Business Is Lots Better

**F**INANCIAL reports on the leading tournaments of the summer show a decided increase in gallery interest and income. The National open gate was approximately \$16,000, split 50-50 between the USGA and Merion. No figures on house or outside concession income at Merion during the tournament period are available but despite luncheon courtesy cards issued to press and wire employees, restaurant and bar income probably was above that at North Shore during the 1933 open.

The Western open at Peoria brought in \$1,946 as the Western Golf Assn. share of the gate, indicating that the entire gate was around \$3,100. The Western association made money on its open for the first time since 1930. Reports of the Peoria CC profit from restaurant and bar put the figure at approximately \$1,500.

Buffalo's Junior Chamber of Commerce early figures indicate that the organization is between \$100 and \$200 in the black although expenses for this splendidly run championship were heavy, including a charge for the course. The Park club income from restaurant, bar and concessions was reported as having a high day gross of \$1,000.

St. Paul Junior Chamber of Commerce

on this year's St. Paul \$5,000 open did better than ever before financially. The boys broke even so the national advertising they gave their community cost them nothing. Bar and restaurant business at the Keller municipal clubhouse during the tournament was at high, but the J C of C got no share of this.

For civic advertising, Buffalo got the best break of any of the tournaments. The PGA was played with perfect weather conditions while the rest of the country was sweltering. Press reports frequently mentioned this fact.

### Fee Course Pays Pros \$3,000 for Publicity

**T**HE \$3,000 Rivervale Open, to be played September 13, 14 and 15 at Rivervale Country Club, Rivervale, N. J., brings into national prominence a public course that has been open three years. It presents a watering system, excellent fairways, rolling and tricky greens, and a location but 30 minutes from Times Square, New York City.

It plays about 6,600 yards, with the tee shots fairly wide open but every approach needing accuracy, since the greens are closely trapped. There are five water holes and the par of 72 has never been broken in competition.