

points. The gardens were cared for the same as the fairways on the courses on which they were located and monthly reports were made out over a period of five years. The fertilizers were applied on a nitrogen basis spring and fall at the rate of about 900 pounds per acre for a fertilizer containing 6% nitrogen, which makes a total of approximately 108 pounds of nitrogen per acre per year. A few of the gardens were planted on soil deficient in phosphorus and this may have given the 6-12-4 fertilizer, which contains four times as much phosphorus as the 12-6-4, the slight improvement shown. It is however interesting to note that the comparatively small amount of available phosphorus supplied with the 12-6-4 was sufficient for the immediate needs of the grass. Soil analyses of these plots showed that the plots receiving 12-6-4 in most cases showed no loss in available phosphorus and in some cases showed considerable gain. A reserve supply was being built in the 6-12-4 plots as these showed as much as 300% increase in available phosphorus.

It will be noted that the turf on the two complete mixed fertilizers and the sulphate of ammonia plots which are the only three inorganic nitrogen plots in the series has become worse during five years fertilizing whereas the organic fertilizer plots all show an improvement. A possible explanation of this may be found in the fact that these three inorganic plots all received their nitrogen from sulphate of ammonia and ammonium phosphate. These ammonia salts gradually deplete the soil of lime and increase its acidity. A soil test was made of the plots in this test to discover if the lack of lime had anything to do with the behavior of the inorganic fertilizer plots. The test showed that the two complete fertilizers and the sulphate of ammonia plots had become more acid dropping to an average of pH 5.5 while the average of the check plots was pH 6 and the organic plots ran pH 6 and above. The acid condition and loss of lime brought about by the steady use of sulphate of ammonia and ammonium phosphate is no doubt responsible for the considerable drop in perfection shown in the five years these plots were fertilized.

Apparently ammonium nitrogen stimulates rapid growth and was responsible for the high ratings of these plots the first year, but due to the decreasing lime supply the grass was unable to maintain its original high state of perfection. There-

fore when these fertilizers are being used it is necessary to determine the soil acidity occasionally. Theoretically the acidity developed in the soil through the use of sulphate of ammonia would be equivalent to about 100 pounds of hydrated lime to every 100 pounds of sulphate of ammonia but in practice the lime requirement seems somewhat less than this. If clubs will check on the lime requirements of their fairways from time to time and supply this material when needed the danger from continued use of ammonium fertilizers would be removed. However on courses where it is unlikely that a close check will be kept on the condition of the fairway soil it is probably safer to use mostly organic fertilizers from year to year.

Balance of Mr. Welton's authoritative article on fairway fertilization will appear in our August issue.

Cites Arsenate Control of Webworm Menace

By BONNY WEAVER
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IOWA greensmen were having a tough tussle with webworm recurrence and most of them quit chemicals for the less costly but less effective kerosene emulsion. In last season's disastrous drouth the parched plants would soak up our emulsion like rain and, while the worms retreated, the bent shriveled and died. With water scarce we couldn't soak the greens before each application and I, for one, got pretty fed up with the situation. Experimenting on some sections at Keokuk, I found our previous experience with arsenate was mechanically at fault. We'd used 5 pounds to 1000 sq. ft. and let it soak. The webworms seemed to just wait for the solution to seep down before they scurried through it to feed on the clear three inches of bent and topsoil.

I aim to saturate the surface and permit seepage to cover only the first three inches. Before an application, my green is watered enough to carry for three days' play. Then the poison is sprayed on—three pounds per 1000 sq. ft. in solution—and the surface goes white. The stored water prevents the solution from soaking deep and it has routed the worms upward. Four days show a complete kill and vigorous turf. The infrequent applications cut maintenance costs considerably and play is not interrupted.