

ting greens; that is, we start at about 150 yards from the tee and fertilize up to about 275 yards, and then about 50 yards on the approaches to the putting green. The soil on our east course is a clay loam, and on the west course a sandy loam. We discontinued the use of lime in 1916, but have continued using mushroom soil since 1915.

Fortunately we have no real bad slopes on our course, although we did have some bad spots on some of our sloping fairways on the west course, which required fertilizing to the extent of twice as much as on the flat fairways. We however have some shaded spots, which we seeded with rough-stalked bluegrass (*Poa trivialis*). This grass makes a good turf under shade conditions, when fertilized in the same way as our other fairway turf.

With new plantings on the fairways and tees we generally use the same method of fertilizing as outlined above, except that the areas are top-dressed more frequently, and the activated sludge is applied at the rate of about 500 pounds per acre mixed with about 100 pounds of acid phosphate.

All our tees are treated the same as the fairways, except that we can water the tees, but not the fairways at the present time. We are contemplating irrigating the entire east course, when we should be able to keep our famous course in perfect condition during the summer months. We believe that with irrigation we shall not have to wait anxiously for rain in order to apply the sulphate of ammonia or other chemicals such as are used in the checking of brown-patch, in order to prevent burning of the turf. We also have reason to hope that with irrigation a great percentage of annual bluegrass (*Poa annua*), which has gradually invaded much of our fairway turf, will survive the summer months, inasmuch as where the sprinkler reached last year nearly all of this desirable grass lived through the summer.

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## The Fairway Problem on an Alkaline Soil

By John MacGregor

Our main fairway problem at the Chicago Golf Club, near Wheaton, Illinois, seems to be a fight for the control of weeds and clover. The black gumbo soil on which our course is built is of a high lime content, and a factor which tends further to increase the alkalinity of the soil is the lime in the water used for irrigation. Three years ago we started using a commercial fertilizer which we regarded as suitable for counteracting the alkalinity of the soil, and although we realize that it will be a slow process to accomplish this purpose under our particular conditions, covering no doubt a period of several years, we are encouraged to believe that we are working in the right direction. The analysis of the fertilizer we use is 12 per cent nitrogen, 6 per cent phosphorus, and 4 per cent potash. Until now there has hardly been any noticeable difference in the growth of weeds and clover on our fairways, except that this spring the leaves of the clover seem to be smaller than usual.

In addition to the use of fertilizer to counteract the alkalinity of the soil, we have adopted the plan of maintaining a creeping bent and fescue nursery for fairway purposes so as to supply us with turf with which to replace the clover. This nursery was started three years ago, and we found the move to be a wise one. The year after

the nursery was established the clover had increased in places in the fairways. The following spring we commenced to strip the areas where the clover had gained supremacy, replacing it with bent and fescue turf. We are continuing this feature of our program this spring. Seeding such areas in the spring we have found to be very uncertain. Tractors and mowers going over these spots disturb the young grass and usually result in patchy fairways. Our faith in the bent and fescue grasses as a means of retarding clover in fairways is based on our experience with these two grasses in certain of our fairways which were seeded with Chewings' New Zealand fescue and German mixed bent. One-third of our fairways were seeded with a mixture of redbtop and fescue, and two-thirds with fescue and German mixed bent. We have found that the latter combination makes an ideal fairway, forming a dense turf in which weeds and clover do not seem so readily to gain a foothold. It is on the fairways that were seeded with redbtop and fescue that we are having our main fight with weeds and clover.

The turf on our fairways is six years old. About seven years ago the course was reconstructed. At that time the fairways received a heavy application of barnyard manure, which was plowed under, and the areas were then seeded with oats and soy beans. When these had gained a height of about 1½ feet, they likewise were plowed under. The fairways were then prepared for seeding with grass. We considered that the growth of oats and soy beans which was plowed under would give us ample humus in the soil for a period of four years, high in nitrogen content. We still follow this system in new fairway plantings, growing and plowing under a green-manure crop of either red clover or soy beans. When the area is then turfed, it is top-dressed with a compost rich in humus. A green-manure crop is also grown and plowed under on the areas in our fairway turf nursery from which we cut turf for patching. These areas are plowed in June, then planted with soy beans. When the crop of soy beans has attained a height of 1½ to 2 feet, it is plowed under and permitted to lie for two or three weeks before anything is done. The ground is then thoroughly disked weekly until time for setting out the nursery, this cultivation serving to keep the soil clean of weeds and foreign grasses.

We fertilize all our fairways once a year, in the early spring before the frost is out of the ground. We have found a lime spreader an ideal machine for making the application. The fertilizer is applied at the rate of 700 pounds per acre. Special attention is however given to the approaches. About 12,000 square feet of approach area is given a compost top-dressing in the spring in addition to application of fertilizer; and every month, when top-dressing the greens, about 2,000 square feet of the approach is also included. This latter area we consider very important.

We have found applications of commercial fertilizer very beneficial to mossy and shaded areas, and for washed slopes a heavy top-dressing with compost is used. On baked clay areas we use a compost with a higher percentage of sand. The tees are treated the same as the greens, receiving a top-dressing of compost once a month; but the grass on the tees is not cut so close as on the greens.

Notwithstanding the high percentage of lime in our water, we find it necessary to keep the fairways well watered in order to have them in good condition. The weather this spring was anything but in our

favor. It was two months after the fairways were fertilized this spring before we had any rain; and in all likelihood, the acidifying effect of the fertilizer on the soil was entirely counteracted by the lime content of the water applied.

### Applying Sulphate of Ammonia with a Water Cart

By T. S. Harvey, Jr.

At the polo field of the Ox Ridge Hunt Club, Darien, Conn., sulphate of ammonia is applied to the turf with a water cart, as shown in the accompanying illustration. The cart is drawn by a tractor, in lanes of 8 feet, which is the width of the sprinkling bar. The capacity of the cart is about 200 gallons. The water supply is located at one end of the field. The supply valve is regulated so that the cart is able to make the one trip up the field and one trip back. The



Applying sulphate of ammonia with a water cart.

area covered in a round trip, the field being about 900 feet long and the sprinkling bar 8 feet wide, is 14,400 square feet. The sulphate of ammonia is applied to the turf at the rate of 4 pounds per 1,000 square feet, 57.6 pounds of the sulphate accordingly being used in each barrel of water per round trip. It takes about a day to cover the entire polo field, which is about nine acres in area. The sulphate is applied four times during the year, twice in the spring (May 10 and 30), and twice in the fall (September 10 and 30).

**Experiment, and keep on experimenting.**—A rule of turf maintenance that is a success on one golf course may be a failure on another. The local character of the soil and local climatic conditions are generally the decisive factors that limit the use of a particular grass or of a certain cultural practice. Before inaugurating a new practice on a general scale it is always advisable first to try it out on a small scale. Every golf course should have its experimental garden.