

no turf, so that the green has not been in play all summer. After the first application of the prepared topdressing it was noticed that many of the patches of chickweed on all of the greens (including the old 9th) turned yellow and disappeared and the turf came back in its place. After each subsequent topdressing more chickweed disappeared until all of the greens are almost entirely free from it and strong and vigorous turf has taken its place.

During July the beetles began to fly over this part of the country and light on the greens. They immediately began to burrow down into the soil to deposit their eggs, and in doing so little piles resembling worm casts covered the surface of the greens. On closer observation, a full grown, dead beetle was found in each pile of earth. It seems that the soil had been sufficiently poisoned to kill the mature beetle as well as the grub.

After the second topdressing early in May, worm casts disappeared entirely from the topdressed area, which would indicate that worms do not take kindly to soil so poisoned.

Although some crab grass appeared in the surface of the tees, approaches and greens, it did not start to grow until the first of August, and then it did not grow vigorously as is its custom. Other unpoisoned areas developed strong, thrifty crab grass plants late in June, which have already seeded at the time of this writing (September). Employees who have worked for many years on this course state that crab grass on the tees, approaches and greens is not one-tenth as bad as it has been in former years. However, the big decrease in the growth of crab grass can not be attributed wholly to the use of arsenate of lead, for sulfate of ammonia has also been used in every application of topdressing. If the marked effect from the use of arsenate of lead is as great next year as it has been so far this season it is reasonable to believe that weeds of all kinds will be eliminated from the poisoned area and a better and more thrifty turf will result.

Milorganite—An Activated Sludge

By H. L. Westover

For years good stable manure has been highly prized for use on golf courses particularly in a compost pile as it furnishes not only organic matter, an essential to proper bacterial life of the soil, but also some of each of the most essential plant food elements. Unfortunately, the supply around cities has been diminishing rapidly due to the marked decrease in the number of horses and mules. This has been associated with a greater demand not only for manure but also for other fertilizers due to the enormous increase in the number of golf courses during the past few years. The limited supply of stable manure and the high price of commercial products already available has resulted in efforts to utilize all sorts of waste products, particularly those which carry considerable humus and in which the nitrogen is in organic form. In this connection sewage has come in for its share of attention as being a potential source of plant food and organic matter. The use of sewage in its natural state on golf courses is not only unsanitary but the odor is very objectionable to the players. Dried in the usual manner the product is more or less inert

and even then can hardly be regarded as a sanitary product. In recent years a special treatment has been devised whereby these objections are obviated, the term "activated sludge" being given to the product. Milorganite is an activated sludge put out by the Milwaukee Sewerage Commission. It is probably the best known and most widely used of any of the activated sludges. It is a granular and porous organic material containing less than 10 percent moisture and of a uniform chemical composition. It carries approximately 5½ percent nitrogen (6½ percent ammonia), about 2½ percent phosphoric acid and a little less than ½ percent potash. The end product is said to be slightly acid, testing about pH 4.4. This acidity results from the use of sulfuric acid used in dewatering and is not objectionable in growing such turf grasses as the bents and fescues. The acid treatment and the high temperature to which the sludge is subjected results in a sterile product that is free from weed seeds and bacteria. It is said that this is the first time in the history of sanitation that a product has been produced from sewage that is very uniform both chemically and physically. Due to its excellent chemical condition it can be applied at a minimum labor cost.

Milorganite has been used on numerous golf courses during the past few years with very satisfactory results. It has been tried in a preliminary way at Arlington Turf Garden and has resulted in very appreciable increase in the vigor of the grass to which it has been applied. As a turf fertilizer Milorganite is sufficiently promising that plans are under way to give the product a more thorough trial in order to determine the effect of continued applications on the grass and also on the weed growth.

It is said that applications of 100 pounds to 3,000 square feet have shown decided benefit, while three times this amount has been applied with no bad effects due to burning where used as a topdressing. To insure quick and certain results it is advised that Milorganite be mixed with sand and soil and allowed to stand under cover for 10 days or two weeks before applying. This treatment is said to promote bacterial activity and to insure conversion of the nitrogen into forms available to the plant.

Where soil is deficient in fertility it is advisable to add fertilizers before planting. Milorganite applied at the rate of 100 pounds per 1,000 square feet and worked into the soil before sowing seed or planting stolons has given very good results. Quick acting fertilizers can not be used safely at planting time as they are apt to injure the seedlings or stolons that have not become established.

On putting greens the effects of a topdressing of Milorganite are apparent for four to six weeks and applications should therefore be made with about this frequency. In fertilizing fairways yearly applications, preferably early in the spring, have proved of material benefit to the turf grasses. On some of the better soils it appears that after the first two years the turf may be kept in good condition by applying Milorganite every other year but on soils low in fertility, particularly sandy soils, annual applications may be advisable.

The nitrogen in Milorganite is not as readily available as in ammonium sulphate and certain other inorganic fertilizers but being

slowly released furnishes nitrogen over a longer period. Some ammonium sulfate mixed with the Milorganite furnishes a combination in which a part of the nitrogen is quickly available and a part slowly available. Due to its colloidal properties activated sludge fixes the ammonium sulfate and reduces the possibilities of burning.

Some of the advantages claimed for Milorganite are that it does not burn the turf and may be applied with safety under all conditions; it is dry and ground sufficiently fine for even distribution; and is practically odorless and free from harmful bacteria.

More About Velvet Bent

The following letter from Mr. W. R. Hurd, 2nd, chairman of the green committee of the United Shoe Machinery Athletic Association, Beverly, Mass., will be of interest to those golfers to whom the growing of velvet bent is of importance:

"I have read the article in the August BULLETIN by Major R. Avery Jones regarding velvet bent and I thought it might interest you to know that the Kernwood Country Club of Salem, Mass., has been raising velvet bent for nine years.

"The United Shoe Machinery Athletic Association Golf Club at Beverly, Mass., has been raising this same velvet bent for two years, and so far we have never seen any brown patches in the sod beds. I wish to say that everything Major Jones has told of we can verify.

"We have one sod bed of velvet bent 150 ft. by 40 ft. which was planted the first of last August, and it is in wonderful shape. We have another sod bed planted the year before this which is about 20 ft. by 60 ft. We have taken turf or sod from the last bed, and used it on a number of our greens for over a year and are very much pleased with the turf. We have a very large mother bed of velvet bent and a large mother bed of Washington bent. We are gradually changing our tee sod over to Washington bent, using the stolon method of planting."

"There is no portion of a golf course which requires more care at the time of construction, and more attention later in the up-keep, than the area upon which most approaches to the hole will land."—The Links.

The Green Section Meeting in Washington

The Green Section meeting in Washington on August 29 was well attended, about 175 green committee chairmen and greenkeepers being present from almost every section of the country east of the Mississippi. The morning was spent in the examination and discussion of experiments at the Arlington Turf Garden. During the afternoon four local golf courses were visited where a variety of turf conditions and maintenance methods were noticed. After dinner an informal discussion was held concerning turf problems in general, which proved of so much interest that the meeting lasted until nearly midnight. This was the first field meeting sponsored by the Green Section.