chickweed or some very closely allied species. As a preliminary test would suggest that you mix a couple of pounds of arsenate of lead in a bucket of soil sand or milorganite and scatter some of this mixture over a dozen patches and note the results over a period of two weeks. This method has proved very efficacious in chickweed control here in the East. I do not think the hypodermic injection of these patches would result in obtaining the results you desire. Treatments of this sort have not proved successful in actual practice.

B. R. L.

Question

Sir:

I note in October GOLFDOM an article with reference to the elimination of quack grass by the use of arsenate of lead. The author speaks of using 250 pounds per acre on fairways and I would be glad to know if this chemical can be applied in any other way than in top dressing.

F. P. C.
(Iowa).

Answer

Sir:

The treatment of fairways with arsenate of lead was discussed in one of my articles appearing in GOLFDOM during the past summer and would suggest that you review the article for specific directions for fairway treatments.

Of late I have been supervising some extensive fairway treatments of golf courses in the vicinity of Philadelphia and in these treatments we have used milorganite as a filler. On one course we mixed 150 pounds of arsenate of lead with 500 pounds of milorganite and applied the mixture to the fairway by means of a lime spreader. This method proved very satisfactory providing the spreading was done on days when the atmosphere was comparatively quiet. If the job has to be done in windy weather it would be better to use 750 pounds milorganite to 150 pounds of arsenate of lead.

Milorganite is a first class *filler* for arsenate of lead in that it is dry, fine in texture, consequently going through the spreader rapidly and also because the arsenate of lead clings to the particles of milorganite, thereby insuring an even spread and the minimum loss of the chemical due to blowing. B. R. L.

Lead Arsenate on Bermuda Grass

Sir:

I have been reading Mr. Leach's articles in GOLFDOM on worm and grub eradication with much interest. I saw in September where W. T. B., and in October Mr. Leach, wanted to hear from the south, so I will endeavor to tell you my experience with arsenate of lead on Bermuda greens.

Our number six green has always been a poor green on account of worms and soil conditions. It is very strategically and beautifully located, but on poorly drained alkali soil.

Starting March 15th I cut the grass very close, then top-dressed very heavily (three yards) on 4,000 square feet with one part black soil, one part sand and two parts manure, which practically covered the grass, but in three or four days we had a good putting surface of nice tender grass. April 15th I repeated the process and it began to improve. May 20th I top-dressed with two yards. By July 1st I had a nice turf and about three worm casts per square inch. July 10th I top-dressed lightly (one yard) with one part manure and two parts sand, which is my regular top-dressing and put twenty pounds arsenate of lead and dragged in with the top-dressing and watered. Next morning I had lots of worm casts, the second morning not so many and the third morning still less. August 8th I repeated the July 10th program, which was 40 pounds arsenate of lead or 10 pounds per thousand square feet. I won't say number six is the best green we have, but it is so much better that 80 per cent of the players have commented on it.

I have also retarded the crab grass quite a bit. I am anxious to see what the crab grass does on that green next year as we have lots of it. I have also treated three more greens with five pounds arsenate per thousand square feet with very favorable results.

We also discovered grubs on two of our approaches had been working into the greens, in fact they had damaged the approaches considerably before we noticed them. I gave them a heavy dose of arsenate and stopped them.

I don't think the arsenate hurts the grass one bit but improves it in texture, putting surface and looks, by getting rid of the worms if nothing else, so as you can see I am pretty well sold on arsenate of lead for Bermuda grass. I would like to see more in all the golf magazines on Bermuda grass as I believe it requires somewhat different treatment from bent grass.

G. H. Conger,
Greenkeeper, Dornick Hills Country Club.

Answer to R. C. (Ill.)

With regard to your letter in which you raise the question of the effect of lead

arsenate on turf and mention the fact that certain greenkeepers believe that it is shortening and decreasing the root development would advise that these gentlemen have the wrong bull by the tail. As I have said before, lead arsenate is going to be the goat for all the ills and troubles that affect golf greens for some time to come. Whenever an arsenated green goes bad it will be the lead arsenate that caused the trouble. This is of course inevitable and time only will correct the general condition.

I have already had one or two complaints of this nature in this vicinity and have personally looked into one or two of the cases. Not long ago a club which had been using lead arsenate came to me with blood in its eye and claimed that the arsenate had *ruined* six of their greens. I was fearfully busy at the time but took a day off and went down to look at their grass. It sure looked rotten, I'll admit that much. It was yellow and sickly. I took out my trusty jack-knife and cut into the sod and lo and behold an inch and a half below the surface was as beautiful a layer of hard clay one inch thick as I have ever seen. In other words two or three years ago some jackass had gotten the idea in his bean that the greens were too soft and had top-dressed one whole summer with pure clay. When the organic matter burned out of this clay it formed a sort of hard pan and interfered with the drainage. This past summer we had an exceptionally heavy rainfall, these greens went soggy and these men looked around for a convenient goat and picked lead arsenate. And so it goes.

Not long ago I had luncheon and a very interesting hour's conversation with the golf architect. During the meal he put this question to me: "Why do so many greens go bad two or three years after they are built!" I judge from his question that in his experience, greens are going bad more or less all the time regardless of lead arsenate. I answered his question as follows:

"Let me see and inspect the golf green that has gone bad and in the majority of cases I can tell you what has caused it to go bad. Aside from disease and improper or too heavy fertilization there are two major causes for greens going bad. First, improper drainage, either surface or subterranean. Greens will go bad under these conditions and especially in wet seasons; second, top-dressing with the wrong kind of compost, one containing too much clay or too much sand. Top-dressing is an art, although many people consider it only as a tedious job.

We have turf here that has been arsenated for seven years and plenty of it that has been arsenated for three and four years. It is still going strong.

When lead arsenate loses its toxicity to grubs, worms and weeds it becomes *inert* just like so much sand or cinders and does not affect the grass one way or the other.

B. R. L.

O. K. on These Bermuda Greens

I think our course right now affords the finest example of the use of arsenic of lead and its non-use that you can imagine. The greens are as near perfect as Bermuda greens can be, while the fairways, where arsenate of lead was not used, are in a sad state. Some of them look like they had been literally plowed up. (By June beetle, I presume.—B. R. L.)

W. G. J.
(North Carolina.)

Question

Sir:

Here, at southwest Florida, we have a new 18-hole golf course with carpet grass (seeded) fairways and Bermuda Grass (sprigged) greens. In about ten days we plan to top-dress heavily and sow Italian Rye and Red Top in our greens.

Last year the putting greens of the old nine-hole course were in bad shape. The grass (we kept Bermuda Grass putting surfaces throughout the winter) began to die out—in spots and in strips—we dug up parts of the affected areas, and searched thoroughly for grubs. Quite often we would find as many as three or four white grubs, very often none, in sods one foot square and six inches deep. Samples sent away to State Experimental Station were reported as infected with something "similar to brown patch" and copper lime dust was prescribed. This treatment gave a measure of control, but only for a few days at a time, and finally the copper poisoned the soil and then the winter season, for which the course is pointed, was over.

Now, about ten days ago what was probably the same trouble reoccurred. Some sand was applied without any appreciable effect, and then copper lime dust was applied, and when the writer arrived from his summer job three days ago the affected area looked healthy enough. The affected area was a band about four feet wide, stretching across the green. On this area, as well as on other putting surfaces, there are sandy piles this morning, of about a good tablespoon in quantity. These have the appearance of casts, although the soil is so sandy that there is little form to them. Also digging did not reveal any worms or crickets.

Under the circumstances we have just about made up our mind to apply arsenate of lead when the trouble reoccurs. Of course if we are guessing wrong we are giving the trouble a head start, and that is why we would like your opinion in the matter.

Does arsenate of lead have any virtue as