How to Grub-Proof Established Greens

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Nature plays an underhanded game with the greenkeeper and kids him into the belief that she is co-operating. She helps him to grow and develop a beautiful green until it is a sight for sore eyes, and as a result the average greenkeeper stands off to one side, takes off his hat and says, "Aint Nature grand."

There never was a greater fallacy in greenkeeping than this idea that Nature is on the side of the greenkeeper. She doesn't help him to develop that strip of luxuriant turf because she loves the greenkeeper or the game of golf. Not by any manner of means. Nature assists in this undertaking because she has ulterior motives; because she is making a first class home for her illegitimate offspring in the shape of grubs, worms, weeds and diseases.

From the day that a green is shaped up and in good playing condition, Nature does her best to ruin it. She gives the greenkeeper a battle every day of the year and, until recent years, she periodically whipped the guardian of the greens to a standstill. As far as modern greenkeeping is concerned, the only way to make Nature respect you is to crack her over the snoot now and then with a hundred-weight of arsenate of lead or calomel. She doesn't understand this sort of fighting; it leaves her groggy and bewildered. And in the meantime, your turf is safe.

Several years of experimental work, together with large-scale treatments made under my personal direction, at several golf clubs in the East have shown that 5 pounds of arsenate of lead per 1,000 square feet of turf will render it virtually grub- and worm-proof and greatly encourage the growth of noxious weeds. I know of one club near Philadelphia where the greens were adequately protected from a heavy infestation of Japanese beetle grub by a single application of only two pounds of arsenate of lead per 1,000 square feet of turf. This instance is not given as a dosage recommendation but merely as an indication of the fact that a little arsenate of lead goes a long way in greenkeeping. Arsenate of lead is a relatively cheap chemical and there is no object in cutting the dosage so low that a chance is taken on insuring results. On the other hand, if you want to gild the lily and perfume the rose by applying more than 5 pounds, it is quite all right. The grass will respond to the increased amount and make a luxuriant growth unobtainable from the use of fertilizers. I have grown good turf in soil containing 100 pounds of arsenate of lead per 1,000 square feet of turf.

Under the circumstances the danger of employees overdosing the turf need not give rise to undue concern. Be concerned only that each square foot of turf receives its share of the arsenate; in other words, insist on efficient and even application of the chemical.

In treating turf with arsenate of lead, it is poor business to dust, spray or otherwise apply the chemical by itself. In the first place, arsenate of lead is a fluffy, impalp-
A corner of the experimental plot at Riverton, N. J., where the arsenate of lead method of grub-proofing was developed

able powder, easily blown about by the slightest puff of wind. When, therefore, you try to dust it in, the powder blows about and is deposited everywhere but where it is intended to go. Secondly, no novice can dust a small amount of the chemical evenly over 1,000 square feet of turf. Thirdly, the chemical sticks to the foliage if the blades of grass are at all moist and may cause a surface burning. While this burning is only of a temporary nature, there is no sound reason for causing it. For this reason spraying is not advised.

How to Apply to Turf

One of the two best ways of applying arsenate of lead to fine turf is to mix it with moist, not wet, sand or screened soil, say one or two bushels to a green, and sow or scatter it over the green before or after topdressing. Do not use clay soil or heavy loam for this purpose as it has too great a tendency to lump, thereby causing an uneven distribution of the chemical. By mixing with soil or sand in this way, the arsenate of lead clings to the soil particles and sifts down through the blades of grass without clinging to them. In this connection, avoid applying the arsenate of lead to fine turf when the grass is wet. If you have an employee who can sow or scatter the mixture of soil and arsenate evenly over the turf, this method is the simplest and easiest. Otherwise the second and following method, while involving more labor, is advisable.

Another Method

This second method consists in mixing the arsenate of lead with the entire bulk of topdressing and applying to the green as per the usual way. From experience the greenkeeper knows just about how much topdressing he applies to each green. If the amount of arsenate of lead to be applied is mixed with the required amount of topdressing, the mixing operation being supervised by the greenkeeper, the arsenated topdressing can then be loaded on a truck, carried to the green and applied as usual by the men doing that phase of the topdressing job. This is the system which I instituted at the Pine Valley Golf club at Clementon, N. J., and which they have found entirely satisfactory with their type of labor.

At Pine Valley the arsenated topdressing is prepared in lots of one-half cubic yard each, the mixing all being done in a homemade square type churn mounted on a shaft. This churn has a capacity of one and one-half cubic yards, but only a half cubic yard is handled at one mixing, first, because of the weight involved, and, second, because the machine mixes the small quantity much better as the mass has much more room to roll around in. The manager,
Mr. Norman Mattice, knows just about how much area the half-yard of topdressing will cover, depending on the season of the year, etc., and the quantity of arsenate of lead added to each one-half cubic yard of topdressing is accordingly altered at will.

I personally prefer this method of centralized mixing where the entire operation can be supervised by the greenkeeper or a responsible assistant. It may sound like a lot of extra work, but unless I am badly mistaken you will find in the end that it pays. Greenkeepers are naturally always looking for a short cut in doing big jobs such as topdressing. There can be no objection to short cuts providing they are not too short.

Do not try to mix a few pounds of arsenate of lead with a large bulk of soil by throwing the two together at one operation. It invariably results in an uneven mixture with the bulk of the soil containing no arsenate. It is much better to mix the arsenate with a small bulk of soil, add some more soil and mix again, and continue thus until the entire bulk of soil is incorporated. In any event the system to follow will depend entirely upon the individual greenkeeper, and a little experience will soon indicate the best method for his particular conditions.

When beginning the operation of grub-proofing turf the amount of arsenate of lead to apply at one time per 1,000 square feet of turf will depend on the conditions confronting the greenkeeper. Whether to apply the 5 pounds all at once or in monthly installments of one pound each, depends entirely upon what the greenkeeper is up against as far as grubs, worms or weeds are concerned. If grubs are working in the turf, if earthworms are annoying, or chickweed or crab-grass plentiful, then it will be advisable to apply the entire 5 pounds at one time. This amount will give any of the above pests a good stiff jolt.

If the greens are well under control and the pests are causing no undue annoyance, but the club has decided to inaugurate a grubproofing campaign, the arsenate of lead can be applied at the rate of one pound per 1,000 square feet of turf for 5 successive topdressings. In other words, under conditions where the greens or tees are not threatened with disaster there is no object in putting on 5 pounds all at once, because even after the 5 pounds have been applied, either all at once or in installments, it is necessary to apply one-half pound of arsenate per 1,000 square feet of turf with each subsequent topdressing in order to maintain the surface soil layer in a grub-proof condition. This half-pound dosage is based on a topdressing of one cubic yard to 5,000 square feet of turf, or theoretically a layer of soil one-sixteenth inch thick.

**Top Dressing Must Contain Compound**

Under the present topdressing system of maintaining greens, the surface of the green is constantly being raised by the thin layer of soil deposited as a result of each individual topdressing. If these layers were not poisoned, the original 5 pounds of arsenate would be gradually buried by a composite layer of non-arsenated soil, and grub worm and weed control would no longer be secured.

This half-pound of arsenate can be mixed with the topdressing or mixed with a small quantity of soil or sand and applied after or immediately before each topdressing as described above. Some greenkeepers use arsenate in every other or every third topdressing, increasing the amount to one pound or one and one-half pounds as the case may be. Whether this short-cut system results in the greatest degree of weed control is open to question, but, of course, from their angle and from the immediate point of view, it reduces the amount of labor involved.

**Treat Approaches Also**

There is a pronounced tendency on the part of most greenkeepers to stop short with all treatments of a chemical nature at the edge of the green. While entirely human, it is nevertheless a highly inadvisable system because there are plenty of worms, grubs and weeds in the grass just outside the area of the green proper and they are constantly working their way into the green, with the result that even where a green is arsenated, the outer portions will never be in first-class shape because of the occasional worm or grub which works its way into the green and does some damage before succumbing to the poison.

It is advisable, therefore, to arsenate the approach to the green and a strip at least 10 feet wide immediately around the green so that any grubs or worms outside this "barrier" area get a dose of the poison and are killed before they ever succeed in getting into the green. Arsenate more frequently steep banks around greens and tees due to tendency to wash off.