

## Killing Weed Seeds in Loam by Baking

By Frederic C. Hood

It may interest greenkeepers to learn of the method used by the Kittansett Club, Marion, Mass., for killing the weed seeds in top-dressing for greens. Compost heaps made of manure and loam have been considered safe to use by many clubs if the compost pile was allowed to rot for two or three years, perhaps with the thought that the heat generated by the manure would kill weed seeds. It may, however, be that sufficient thought has not been given to the elimination of weed seeds in other kinds of topdressing.

The foolishness of topdressing greens with any soil or compost mixture which contains weeds is too obvious to discuss; so the problem arises how to kill the seeds before topdressing the green. It is



Soil-baking oven for killing weed seeds.

much less expensive to kill the seeds before they are sown on the green than to dig the weeds out of the green after the weed seeds have been sown and germinated. The Kittansett Club has solved this problem by constructing a simple soil baker; the accompanying illustration shows the simplicity and inexpensiveness of the baker.

A three-sided brick foundation was constructed in an out-of-the-way location on the course, near however to the greenkeeper's tool-house and as central as possible. It should be as near to the compost heap and loam pile as practicable. This foundation could be made out of field stones, but is easier to construct out of brick. The sides should be  $2\frac{1}{2}$  to 3 feet high, about 8 feet long, and 6 feet wide, the walls being 8 inches thick, with a chimney about 4 feet high at the back end. This chimney is necessary to cause a draft so that the wood fire will burn freely. The top of the oven is made of a large sheet or sheets of boiler plate  $\frac{1}{4}$  or  $\frac{1}{2}$  inch thick. Any junkyard would have a suitable piece of material for this purpose, which can be bought for a small amount. This plate is supported by several

1-inch iron rods spanning the two walls. In order that these rods do not bend when they become red hot, they are supported in the middle by brick piers.

A fire is started under the baker, fuel of cord-wood being used or limbs of dead trees which might be trimmed from around the course. If the loam is full of grass roots and other undesirable substances, it is first necessary to screen the soil through a 1-inch mesh screen. After screening, the loam is piled on top of the baker from 12 to 18 inches thick. During the baking operation the loam should be turned over about three times, which takes about 20 minutes for each batch; this is in order to heat all of the loam uniformly.

The loam will begin to steam at 180° to 200° F. After about 15 minutes the loam is shoveled off the oven top into a rotary cylinder screen operated by a hand crank. After passing through the screen the loam is comparatively cold and can be put at once into a small shed for protection against blowing weed seeds and general undesirable foreign substances which might get into the baked loam. After cooling, the baked loam can, if needed at once, be spread on the greens, and the balance not needed stored in the shed for future use.

It will be interesting to know that weed seeds purposely planted in large quantities in samples of loam before baking, could be seen under a microscope to have burst and charred after the loam had been baked. Samples of this loam with these seeds were watched, and no weeds sprouted, proving that they had been destroyed by the baking operation. The danger of burning the soil is not as alarming as one might suppose. Samples of average baked loam and overdone or burned loam were taken and grass seed sown in it. In both cases the seeds germinated at the same time, and continued to thrive equally well. The same experiment was tried using Washington bent stolons instead of seeds and with equally good results, no difference being apparent in the growing qualities of the loam whether baked or burned.

The cost of baking, including all labor costs, should not be over \$1 per yard. The cost of constructing the loam baker was as follows:

2 men, one day at 50c an hour.....	\$8.00
Iron bars from junk dealer.....	1.50
Boiler plate from junk dealer.....	1.50
Cement and brick .....	2.00
	<hr/>
	\$13.00

When the loam is very dry there is no objection to sprinkling it with water so as to create steam. We have put seeds in water and heated the water to a temperature at which the seeds open and apparently become destroyed. The temperature at which they are apparently destroyed is around 200° F. In baking they seem to char, and disappear entirely at a temperature less than 220°. No difficulty has been found in germinating grass seeds when the loam has been baked at 250°.

Prior to the erection of this soil baker we had made plans for putting steam through our soil, but it was found that the cost of a device for creating steam and handling the soil by this method was considerably in excess of \$1,000, while the soil baker was built for \$13. All our laboratory experiments showed that the baking de-

stroyed the weed seeds just as effectively by means of the steam created in the soil baker as by steam created in a steaming apparatus.

The old adage that an "ounce of prevention is worth a pound of cure" in our opinion applies to the cost of baking the soil for top-dressing in comparison with the cost of digging out the weeds on the greens.

---

### Multiple Tees; Their Architecture and Maintenance

The advantages in having a large teeing ground or more than one separate tee for each hole are obvious. It is impossible for any golf architect to lay out a hole having but one small tee which will be fair and satisfactory to all types of golfers. For this reason it is recommended that two and preferably three tees be constructed for each hole. Indeed, this is now being done very commonly. The common practice seems to be to make these multiple tees approximately 10 yards wide and 15 yards deep and to place them so as to give the different types of golfers a chance to play the shot according to the type of hole and the individual ability of the golfer.

Furthermore, multiple tees lend themselves better to efficiency in upkeep, in that one tee may be rested and gotten back into shape through natural recovery of the turf while the other tees are in use.

If a single tee is used, it should be at least 10 yards wide and 20 yards, or preferably 30 to 40 yards, long. With a single tee of these proportions the driving spaces can be rotated and the advantages of a multiple tee in a measure, though less satisfactorily, can be thus secured.

An elevated or raised tee is justified only when it is necessary to secure proper drainage or good visibility. If the ground is well drained it is better, both for architectural reasons and for economy in turf maintenance, to leave the tee on a level with the surrounding ground. A tee so constructed can be cut with the fairway mower.

Don't build your tees too small. The wear and tear on the teeing ground is enormous, and the only way in which to have satisfactory teeing turf is to provide ample space.

The best turf obtainable is none too good for the tees. In the North this is without doubt creeping bent; and in the South, Bermuda grass. The turf nursery should be ample to provide material from which to plant and maintain the tee turf vegetatively; and with proper attention as regards topdressing, fertilizing, rolling, and watering, a satisfactory teeing turf can be maintained at all times with relatively little expense. There is nothing so conducive to bad driving as a scraggly, uneven, bumpy tee. In many cases the average golfer drives badly because he is forced to play from very unsatisfactory tees, and the initial effort of his game is automatically destroyed because of the condition of the ground from which he drives.

---

Back numbers of the *Bulletin* are available to member clubs of the Green Section at 35 cents per copy. The entire 12 numbers for 1925 can be supplied, and of previous years as follows: 1924—all months except January and March; 1923—March and June to November inclusive; 1922—July, August, October, November, December; 1921—entire volume bound in paper, \$2.25.