

the end of the long day there is a tiny heap back of the screen and a big pile of hopeless-looking debris at the side that would not go through the screen. When the task is done, there is just one monument left for the club's treasurer to see and that is the pile left over from screening, and then he will consider the purchase of a compost grinder.

There are a number of these on the market ranging from the home-made rig derived from an old thrashing machine cylinder to the more elaborate type. The one we are using at Golden Valley² has a grinding cylinder leading to a revolving screen. The machine may be run with a belt and pulley from a tractor or a portable engine. We use a long belt running to our tractor, which keeps the engine well away from the dirt and dust. The long belt also has the advantage of throwing off when a rock gets into the machine, preventing serious injury to the cylinder. The teeth of the grinder are $\frac{7}{8}$ -inch square steel pegs about three inches long, and the compost is crushed rather than cut. Consequently, straw, roots and even the quack grass rootstocks are not broken and will not pass through the screen. It is a decided advantage over the machines with sharper teeth, which have a tendency to cut up all materials. Anything the machine rejects is really unfit for use.

We have recently screened material for a new green with this machine. The peat was dug about two months before using and was simply piled up without composting. It took three good shovelers to feed the machine, and about 60 per cent. went through the screen. This material was a pure sphagnum peat, practically unscreenable without grinding. There was no trace of broken root stocks in the finely sifted peat, although very abundant in the original material.

We are now sifting the clay topsoil taken from the green and traps. Nearly 90 per cent. is delivered and is almost as fine as flour. By using two men shoveling topsoil, one peat and one sand, the green's soil can be delivered ready-mixed at a very decided saving.

A good compost grinder will certainly pay its way on an eighteen-hole course and will deliver a far better top-dressing than can be obtained by hand-screening.

Turf Grasses in Canada

GEO. H. CLARK, *Seed Commissioner, Ottawa, Canada*

Ten years ago there were not more than about a dozen golf courses in Canada. Now, there are said to be more than two hundred, most of which have come into existence since 1918. The problems connected with suitable turf production, particularly for the putting-greens, would seem to be more highly technical than the business and professional men, who are enthusiastic in the work of developing new golf courses, had imagined. Most kinds of grasses look alike to them. The managements of some of these young clubs have been the unsuspecting victims of incompetent golf course "mystagogues" who are able to make a fair success in the arrangement and construction on the course, but who are able to identify grasses only by the name that appears on the invoice.

Perhaps it has been wrong to advise golf clubs in general to buy seed

²The machine referred to is that illustrated on page 268 of the September BULLETIN.—EDITORS.

of creeping bent grass and creeping red fescue for their putting-greens. These grasses depend for reproduction on their natural habit for spreading by stalks that creep along the surface or under the surface of the ground, and they produce seed quite sparingly. In consequence genuine seed of these varieties is scarcely available in quantity for commerce. It is exceedingly difficult to differentiate between the seeds of these desirable varieties and of some other common sorts; hence the opportunity to substitute.

In the hope of securing genuine seed of creeping bent grass and of creeping red fescue at any cost the writer has on several occasions ordered these seeds direct from European sources that were believed to be reliable, and produced therefrom bowling greens and putting-greens that were redtop or sheep's fescue with an occasional patch of grass that possessed the desired creeping habit of growth. The fault does not belong as much as has been supposed to our American seedsmen.

On the advice of golf course contractors, most golf clubs in process of development are ordering creeping bent grass and producing therefrom a green of ordinary redtop. The redtop of commerce is an excellent grass for the production of hay. The stalks grow upright. A fine putting-green may be developed from the seed of redtop; but it is not to be expected that any grass with the upright habit of growth, like the redtop, will stand the close cutting of a putting-green and survive severe winters followed by the superstimulating effect of the hot sun in the early spring during the process of transition from the dormant life to active growth. In our northern areas we are able to and sometimes do apply brush or lattice fence to the putting-greens to serve the double purpose of holding a deeper covering of snow throughout the winter and of screening tender grass from the full effect of the sun in the early spring until growth is well established. Fortunately it frequently happens that the critical days of the early spring are more or less cloudy with plenty of rain and not too much heat before growth on the putting-green has made a good start.

The annual repair of putting-greens entails a heavy charge on the revenue of most golf clubs. The purchase of more seed of the same kind that has winter-killed is the usual course followed. The borrowing of sod from the fairways is also commonly practiced. Some of the older clubs, having observed that the patches of creeping bent grass on the putting-greens do not winter-kill, proceed to take from the fairways any patches of creeping bent grass that have developed and transfer them to the putting-greens. This has tended to reduce the annual cost of repair of putting-greens.

During the last two or three years, following the lead of some of the best-experienced golf enthusiasts in the United States, a few of our Canadian golf clubs have made a start in the development of a nursery acre or two acres, where ideal patches of creeping bent grass from wherever they can be located are transplanted as one would transplant strawberries. By this process it is comparatively easy to develop ideal sod for the repair of putting greens. It is surprising how rapidly a desirable form of creeping bent grass will spread when not too closely cut. This week the Rivermead Golf Club of Ottawa is transplanting a large patch of desirable creeping bent grass that had been discovered by Dr. M. O. Malte, and transferring it to their nursery plot. This particular patch of creeping bent

grass produced practically no seed throughout the season. It would seem to depend for reproduction exclusively on its spreading habit of growth.

Our creeping red fescue at the Rivermead Club was obtained from Dr. Holy, plant breeder of Czecho-Slovakia. An endeavor is being made to have seed of this strain of creeping red fescue grown on contract, looking to future seed supply. The strain of creeping red fescue we have will produce seed sparingly.

Unless the managements of golf clubs can secure unquestioned assurance as to the genuineness of seed of creeping red fescue or creeping bent grass, they would probably meet with greater success by using in substantial part seed which is on the market under the name of Rhode Island bent grass and which is less difficult to obtain in commerce. It is much to be preferred to redtop and on most soils there ought to be much less danger of winter-killing on the putting-green where Rhode Island bent grass is used than with the ordinary redtop of commerce which may or may not have been supplied under the name of creeping bent grass.

A half-inch dressing each autumn, at the conclusion of the season, of fine compost made from peaty surface soil that is practically pure humus, will usually be found to be beneficial to the putting-green. An annual dressing of this material will maintain a surface soil for the putting-green of an inch or more of soft humus, in which the roots of the grasses will thrive notwithstanding repeated rolling and trampling. Acting on the recommendation of a golf course "mystagogue," one of our new clubs last year bought several carloads of "golf humus," paid a substantial price per ton, and freighted it more than two hundred miles, and then discovered that the surface soil of several acres of the low marshy ground on their own property was quite comparable to their imported golf humus.

Standard Cost Analysis for Golf Courses

GUY C. WEST,

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The recent discussion on standardizing cost analysis for golf courses has caused the writer, who has had some experience with cost analyses for park systems, to evolve the following system, whereby certain comparisons can be drawn between expenditures of different golf clubs for various lines of work.

It must be borne in mind that all expenditures must come under some heading or item. For these items the following are suggested to cover the work for the average golf course. Where other work is carried on, other items can be added.

A. NEW CONSTRUCTION.

1. Fairways.
2. Greens.
3. Rough.
4. Tees.
5. Traps.

B. MAINTENANCE.

1. Fairways.
 - a. Mowing.
 - b. Renovation (includes fertilizing, seeding, repairing divots, etc.).
2. Greens.
 - a. Care (includes mowing, rolling, sweeping, pest eradication, etc.).