CHAPTER X

Subsequent Care

The land once well prepared, the seed well chosen, and the seeding properly performed, there remains the continuing care and good management if the golf turf is to be satisfactory. The maintenance cost of any enterprise is known to be great, and oversight must never be lessened; this is as true in keeping up a good turf as in other undertakings.

MAINTENANCE OF PUTTING-GREENS

In most parts of this country the maintenance of a putting-green in first-class condition represents the acme of accomplishment in grass culture. This is largely true because the climate, with the exception of rather limited areas in the United States, is not favorable for the development of a high quality of fine turf, so that good putting-greens can be maintained only by constant, intelligent, and in most cases costly, attention. Even in the Middle Atlantic states where the finer turf grasses are used, and where

both soil and climate are for the most part unfavorable to their best growth, some excellent putting-greens are maintained throughout the entire year. From this it would appear possible with the data already available to prescribe a course of treatment that could be depended on to give uniform and thoroughly satisfactory results, but there are so many uncontrollable factors that no one, regardless of his training and experience, is capable of outlining a treatment that will prove infallible. Knowledge of the subject of fine turf-culture is, after all, a very vague, uncertain kind of knowledge, and it is no confession of ignorance to admit that recommendations for the care of putting-greens must necessarily be of the nature of general suggestions rather than hard and fast rules strictly to be followed.

To obtain a good putting-green is one thing, and to maintain it is another. Many greens have been very promising at the beginning and have continued in a satisfactory condition for a season or even longer only to break down at a critical time, and refuse to recover under the best known treatments. However, there is little doubt that many failures could have been obviated by the application of certain fairly well-defined principles of turf-culture.

Fertilizing.

There is now, and probably always will be, a decided difference of opinion with regard to the use of fertilizers on putting-greens. This difference of opinion is not confined to the kinds of fertilizers, and the time and rate of application, but extends to the broader subject of whether they should be used at all. After examining the evidence carefully, there can be little doubt as to the benefit of fertilizers, but with regard to the kind, time, and rate of application there is some room for a legitimate difference of opinion.

The one fact that is brought out clearly as the result of experiments with fertilizers is that top-dressings have a stimulating effect on the growth of grass. Turf that has been developed on soil that is naturally fertile needs comparatively little fertilizing, but on the average putting-green soil fertilizers are certainly helpful. If the grass starts slowly in the spring, an application of ten pounds of nitrate of soda to a thousand square feet carefully applied is decidedly beneficial. As a fertilizer to be used regularly, nitrate of soda is preferable to sulfate of ammonia, and in the opinion of many green experts is the most satisfactory fertilizer for putting-greens.

Two, or possibly three, light applications of nitrate of soda in the spring at intervals of a month apart are preferable to a single heavy application, but the advisability of using this fertilizer in the summer months is yet to be demonstrated

A more lasting fertilizer than nitrate of soda in many cases seems desirable, and for this reason bone-meal is very commonly used, regardless of the fact that it appears to encourage the growth of White Clover. A study of the practices followed by the various golf clubs throughout this country with regard to the use of fertilizers reveals a very extensive use of bone-meal, which is surprising in view of the prejudices commonly held against it. Very early spring applications of bone-meal at the rate of twenty pounds to 1000 square feet almost invariably improve the growth of grass, and the effect lasts throughout the season. Cottonseed-meal can be used instead of bone-meal if desired, but applications of it sometimes produce injurious results, and therefore caution is urged in connection with its use. Cottonseed-meal contains approximately 7 per cent of nitrogen, 1.5 per cent of phosphoric acid, and 2 per cent of potash. An application of 25 pounds to 1000 square feet is usually recommended for putting-greens.

It appears from the data at hand that a rational application of a fertilizer high in available nitrogen and relatively low in phosphoric acid and potash is more beneficial than an application of fertilizers containing nitrogen alone. A moderate dressing of a quick-acting, nitrogenous fertilizer in the early fall has proved very helpful. However, it is not well to fertilize putting-greens heavily late in the fall, as it has a tendency to induce too active growth before winter begins. Fertilizing during the hot summer months has not generally given good results, and cannot be recommended.

It is a very common opinion that fine turf needs some protective covering during the winter, and, therefore, well-rotted manure and other humous materials are very generally used for this purpose. The need for a protective covering for grass in most parts of this country has been very greatly overestimated, since thoroughly drained greens composed of the bents and fescues when left uncovered are very rarely injured by winter conditions. Applications of humous materials, however, serve a very useful purpose in supplying organic matter to the soil, and such applications can be made to advantage in the winter or early spring. However,

no manure or other organic material should be applied that is not thoroughly comminuted; otherwise, the grass under the large pieces is likely to be killed. The material that is applied in the winter should be so fine that little or nothing will remain to be raked off in the spring. Spiked rollers (Fig. 29) are now manufactured for perforating the turf and thereby enabling the humus to become somewhat mixed with the surface soil. A treatment with such an implement is helpful just before and after the application of the humous dressing. Top-dressings of humus in the spring frequently produce immediate results. This is probably very largely due to the fact that they raise the temperature of the surface soil. Even inert peat moss has been observed to cause the grass to start quickly in the spring. No matter when applied, humous dressings should be worked into the turf with a coarse brush or broom.

Apparently the only legitimate objection that can be raised to the use of humous dressings on turf is that they have a tendency to encourage infestations of the June beetle. These insects live on the humus in the soil, and are more common in areas that have been treated with manure or similar materials than elsewhere.

Sanding.

Putting-greens on heavy clay soils should receive dressings of sand at least once a year, and preferably oftener. Sand greatly benefits the character of the soil by improving its drainage and water-holding capacity, and producing other beneficial effects. In the improvement of the texture of clay soils, sand should be used liberally, as the sand produces a permanent change, while those induced by organic matter are at best of a temporary nature. Several applications of sand in the late autumn or winter aggregating in all the equivalent of a surface layer one-fourth of an inch in depth protects the grass to some extent, and reduces the effects of heaving. Sand materially aids in increasing the thickness of turf on clay soils. Fine sand, or sand containing a rather high percentage of silt, is not desirable, as it is inclined to form a crust, and because of its fine texture it does not appreciably improve the soil. Even heavy applications of coarse sand on putting-greens are soon taken up by the soil so that they do not interfere seriously with play.

Rolling.

Rolling is a treatment that should be employed in moderation, especially on putting-greens. The popu-

lar belief that rolling appreciably promotes the growth of grass has been largely responsible for the liberal use of the roller. The chief function of the roller is to smooth out irregularities in the turf due to alternate freezing and thawing in the spring, and to other causes. Heavy rolling should never be practiced on stiff clay soils, especially where the turf is thin. On sandy soils it does very little damage. Light rolling in the spring and occasionally throughout the season is helpful in maintaining a smooth turf. On the putting-greens a light, wooden roller used when the ground is wet, either by rain or dew, can do no damage. Water-loaded rollers have been found to be quite satisfactory in many cases, since their weight can easily be adjusted to suit the conditions of the soil and turf.

Mowing.

Very early clipping of putting-greens is to be avoided, especially when the turf is not very dense, since the roots of all perennial grasses are annual in duration and must develop in the spring before vigorous growth can take place. Grasses that have a reserve of food material in bulbs or rootstocks produce roots from this reserve, but in the ordinary turf grasses the quantity of stored material is very

small. Consequently, the early and vigorous growth of the roots depends on the food supply liberated in the leaves. If these are clipped early, the growth of the roots is inhibited, and the growth of the grass consequently weakened. Clipping does not force root development. It does, however, increase the stooling of the grass plant, but it does this much more advantageously after a good root system has been formed. Close clipping to the point of crowning should be avoided at all times.

Watering.

The artificial watering of putting-greens during the summer is necessary in most parts of this country. The kind of irrigation is of comparatively little importance so long as a sufficient amount of water is supplied. Erroneous estimates frequently are made as to the quantity of water applied during an ordinary irrigation, and an insufficient allowance is made for evaporation. At the time when watering is necessary, the humidity is relatively low, and more water is needed than would be the case under normal conditions of rainfall. Water should be applied freely at each application, and in such a manner that the ground will absorb it thoroughly. To insure good absorption a light preliminary sprinkling

is helpful. Heavy watering frequently results in much run-off, so that the greens are only slightly benefited, if helped at all. Greens should be thoroughly soaked when irrigation is needed. Light sprinkling wets only the top of the sod, thereby encouraging the formation of surface roots, and in most cases it is more harmful than beneficial. When the weather is hot and the sun shining brightly, watering should be done in the afternoon or evening rather than in the forenoon.

Weeding.

Probably the most expensive and troublesome feature of putting-green maintenance is the eradication of weeds. If left to grow unchecked, weeds will ruin the best greens, even if they have been established under the most favorable conditions. In Chapter XI the subject of weeds is discussed in some detail, but in connection with the maintenance of putting-greens there are a few points to which attention may well be called. The first step in the campaign against weeds is to secure a seed-bed and grass seed that is as nearly weed-seed free as possible. The degree to which this is accomplished has much to do with the future weed problem. The next important step is to commence weeding operations

early in the life of the green and early in the season. If weeds are allowed to make a good start, the damage which they do is often well-nigh irreparable. Spreading perennial weeds should be removed before they have made a mat of any considerable size, and Crab-grass, the worst summer annual weed with which the greens have to contend, should be eradicated as soon as the plants are large enough to pluck. The third step in weed control involves precautionary measures. Weeds, especially Crab-grass, growing near the greens should be prevented, so far as possible, from producing seeds, and the greens should be so constructed that weed seeds will not be carried on to them by flood water. Discretion should be used in the choice and application of fertilizers. Top-dressings containing vital weed seeds should be avoided, and likewise fertilizers which unduly encourage the growth of clover and other undesirable plants.

Reseeding and patching.

Putting-greens are seldom so good that they do not require repairing at some time during the year. The thickening of the stand of grass, or the filling in of small bare areas, resulting from the removal of weeds or other causes, is frequently necessary.

Reseeding in the spring is commonly practiced with a view to remedying poor turf. In very few sections of this country has the reseeding of putting-greens in the spring proved successful. If bare spots in the greens are a foot or more in diameter, a dressing of compost, or similar material with which grass seed is mixed, when applied in the spring, may result in improvement, but areas of this size should ordinarily be repaired by means of sod. Patching with good sod, if properly done, can be accomplished at almost any time during the growing season when the needs require, and is the best means of improving areas of considerable size. It frequently happens that the turf is thin or poor over a large part of the green, and in this case reseeding is about the only feasible method of improvement. Of the many methods that have been tried, reseeding in the early autumn with a seeder that cuts the seed into the turf has proved the most satisfactory (Plate VIII). For best results two applications should be made, one at right angles to the other, to bring about a more even distribution of the seed. A light dressing of fine compost, or humus, may well follow this treatment. If a "cut-in" seeder is not available, the seed may be mixed with the humous material and

spread over the area to be improved. On account of the difficulty which the young grass plants have in successfully competing with the older plants, the percentage of successes in reseeding is usually not high.

Controlling animal pests.

Suggestions for the extermination of animal pests will be found in detail in Chapter XII, but it is well to emphasize the fact that treatment should begin as soon as the work of the pest is in evidence. Moles may, with skill, be trapped promptly, and worms, ants, beetles, and crawfish can be poisoned successfully or otherwise destroyed. The methods, while tedious in certain cases, are nevertheless simple and usually so effective that there is rarely a good excuse for allowing serious damage to result from these pests.

SEASONAL WORK ON GOLF COURSES

Much of the work of maintaining good turf on a golf course must be done promptly as the need for it develops. This applies to such operations as mowing, watering, and fertilizing. There are, however, some things that are best done at a particular season, and it often happens that this is

not recognized until the most favorable time has passed. A few suggestions regarding operations that are best performed at a particular time of the year are therefore worthy of emphasis. These are outlined by seasons.

Fall.

Sowing grass seeds whether on newly prepared land or on old greens is nearly always best done in the fall, preferably September. This need is often neglected because it is not till spring that the greens usually disclose their imperfections. It is good insurance to seed putting-greens every fall.

In the northern tier of states, spring seeding of grass seeds is usually satisfactory, but even there fall seeding is preferable.

In the South, Bermuda-grass may be seeded or planted during the warm season, at any time from spring till midsummer. Italian Rye or other grasses for winter greens should be planted in October.

Winter.

Top-dressing of turf is best done in early winter or northward in late fall. This applies to the use of sand as well as of manure or other humous material.

Spring.

Weeding of putting-greens, especially of Crab-grass and other summer weeds, should begin just as soon as the weeds are large enough to pluck.

Fine grass seed may be sown in spring in the northern tier of states; Bermuda-grass in the South should be sown in the spring. In most states spring seeding is rarely worth while.

Summer.

Mow weedy plants in the rough to prevent their seeding. This is especially important where Crab-grass is troublesome. By mowing the rough from August until frost comes, the trouble from Crab-grass may be greatly reduced.