CHAPTER VIII

The Turf Grasses for Different Purposes

Not all the grasses are equally adapted to the different parts of the golf course. One must be prepared to exercise a wise choice. Some of the main considerations in this choice require discussion.

GRASSES FOR PUTTING-GREENS

Although it has already been mentioned, it is well to emphasize strongly the particular grass seeds that should be sown for putting-greens.

Creeping Bent. — Creeping Bent makes the most nearly perfect turf for putting-greens in all localities north of latitude 38°, that is, roughly, the line of the Potomac and Ohio rivers. South of this line it is to be recommended only in the mountains. The principal requirements to grow this grass most successfully are rich soil and good drainage. Lime is not necessary and rarely, if ever, helpful to this grass.

Rhode Island Bent. — Rhode Island Bent differs

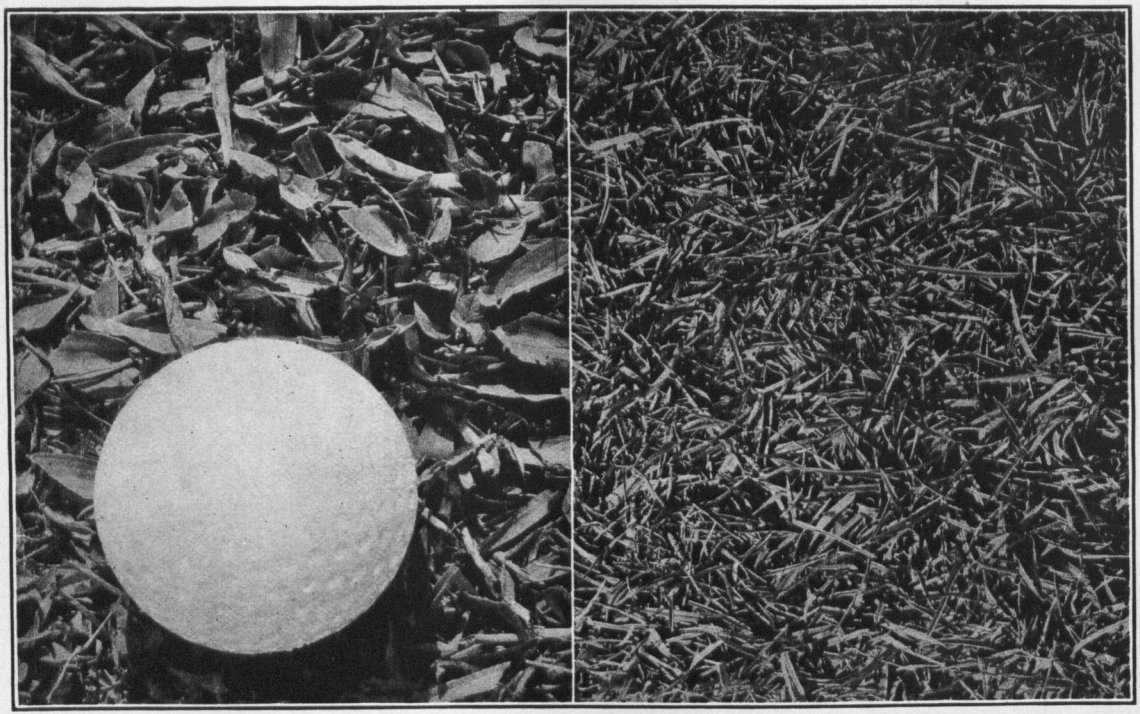

PLATE VI. — Turf of Crab-grass and Creeping Bent, natural size. The ball on the former serves to furnish an idea of the relative putting qualities of the two grasses.

from Creeping Bent mainly in being a little coarser and in creeping only slightly. It is of nearly equal value to Creeping Bent, but pure seed is rare on the market.

Red Fescue. — Red Fescue is a most excellent putting-green grass for the northern tier of states and southward in the mountains. In the lowlands southward it is not very satisfactory to use, except perhaps in mixtures. Red Fescue prefers well-drained soils and is indifferent to lime. It grows best on sandy soils but succeeds well on clays. The seed is often very low in germination.

Bermuda-grass. — For the South there is as yet known no thoroughly satisfactory grass for putting-greens. Bermuda-grass turf, if kept from producing runners, is, however, fairly satisfactory. To secure such result the following factors are apparently important: (1) A compact clay loam soil; (2) An abundance of lime; (3) Good fertility; (4) Moderate watering; (5) Close and frequent clipping.

MIXTURES FOR PUTTING-GREENS

To judge from the literature of prominent seedsmen, the most important factor necessary to secure

a perfect putting-green is the special seed mixture as prepared by each. If this were true, it would naturally follow that the putting-green mixtures produced by the different seedsmen would be practically identical as to composition, even if somewhat different in quality. As a matter of fact, the seedsmen's mixtures do differ, if not radically in the results they produce, certainly in the percentages of their important constituents.

Just what is the basis upon which these mixtures have been compounded is not clearly apparent, but they are not founded on critical experimental data, since no such data are actually in existence. It is true, there is a large amount of experience, recorded and otherwise, with all sorts of mixtures and with pure grasses, under very diverse conditions, but as yet few careful experiments have been conducted wherein various proportions have been critically compared under the same environment. Likewise, few critical experiments have been conducted for the purpose of comparing various grass mixtures with single species for putting-greens. The futility of adopting hard and fast proportions in grass mixtures is clearly shown by the results which the mixtures give when seeded.

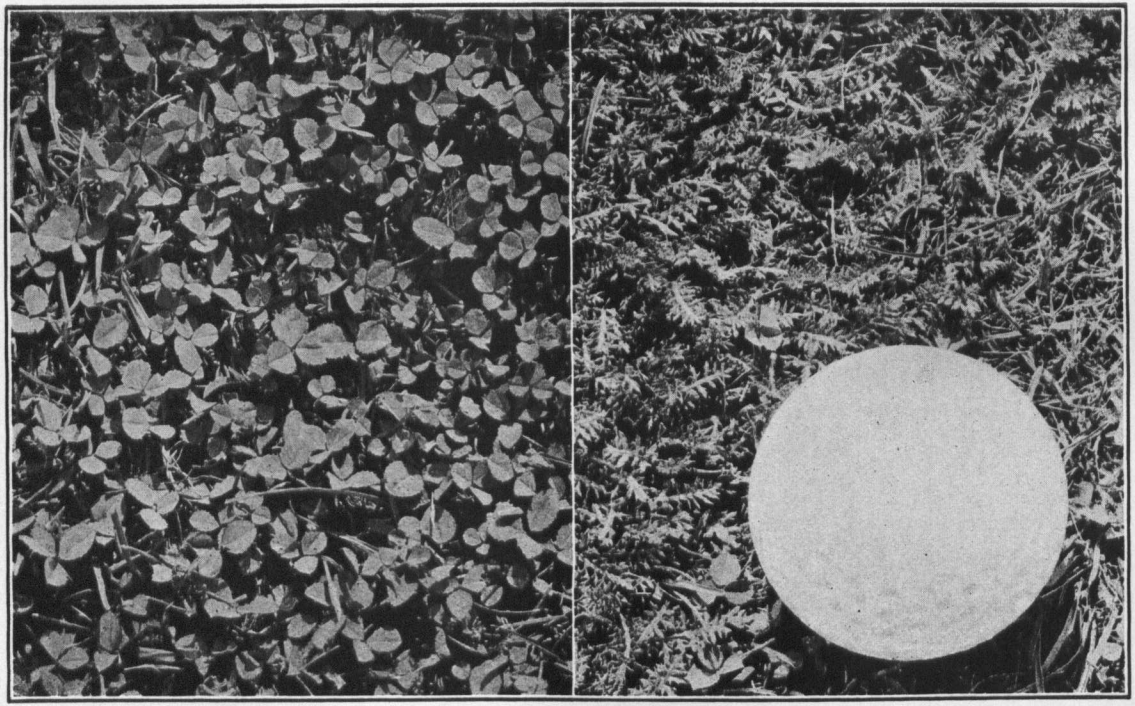

PLATE VII. — Turf of Yarrow and White Clover, natural size. A ball is located on the former.

For example, a lawn mixture very commonly used in the northern portion of the United States is composed of 16 parts by weight of Kentucky Blue-grass, 3 parts recleaned Redtop, and 1 part White Clover. When properly seeded, this mixture gives a very satisfactory lawn with the three component species all in evidence.

If the proportions are changed, it might naturally be supposed that an appreciable difference in the resulting herbage would develop. Such is only rarely the case, and after securing practically the same results from seeding widely different proportions of Blue-grass, Redtop, and White Clover, the conclusion is that the exact mixture idea is not well founded.

A careful examination of several much advertised putting-green seed mixtures reveals in a general way some of the fallacies upon which they are based. A table showing the estimated percentage by bulk of each constituent is given on the following page to illustrate a few important points.

It develops that the best advertised commercial mixtures are composed of *Festuca rubra*, in most cases Chewings' Fescue; Agrostis species, largely Creeping Bent; and Crested Dogstail. In one

case Crested Dogstail was absent, and in another there was a small percentage of Perennial Rye-grass. In number 2 the Creeping Bent was largely or wholly replaced by Redtop. It will be noted that there is a general agreement of proportions in mixtures 3 and 4, but a considerable difference between these and numbers 1 and 2, and between number 1 and number 2. For such a highly specialized purpose as the production of a putting-green, it would appear that some one had blundered, if the compounding of mixtures were really an exact proposition.

APPROXIMATE PERCENTAGE OF DIFFERENT SEEDS BY BULK IN VARIOUS COMMERCIAL PUTTING-GREEN MIXTURES

KINDS OF SEED	MIXTURE No. 1	MIXTURE No. 2	MIXTURE No. 3	MIXTURE No. 4	MIXTURE No. 5
Fescue[1]	80	50	65	55	40
Bent[2]	10	50	20	40	40
Crested Dogstail . .	10		15	3	20
Perennial Rye-grass .				2	

The constitution of these mixtures is also open to criticism. Why seedsmen continue to encour-

[1] By Fescue is meant forms of *Festuca rubra*, probably mostly Chewings' Fescue.

[2] The Bents include the commercial species of Agrostis, namely, Redtop, Creeping Bent, and Rhode Island Bent.

age the use of Crested Dogstail on American golf courses is still undetermined. Whatever its merits may be in Europe, this grass is practically useless in the United States, excepting on the Pacific Coast west of the Cascade Mountains. Most European grasses have become abundantly naturalized in the northern states, but Crested Dogstail is found only rarely, and, even when sown with care, few plants grow to maturity.

Perennial Rye-grass grows well but is quite unsuited for putting-greens, since it is entirely too coarse to be mixed with Creeping Bent and Red Fescue. Incidentally, the inclusion of these two species in putting-green mixtures intended for use in the United States is *prima facie* evidence that the basic principles of mixtures are not fully comprehended by all seedsmen.

Discarding Crested Dogstail and Perennial Rye-grass, what actually composes the mixtures are Chewings' Fescue and Creeping Bent. There can be no criticism of their use, since of all the commercial grasses they are beyond doubt the best two for putting-greens, and the only ones, with the exception of Rhode Island Bent, that should be planted for such purposes in the North.

It is in this connection that another objection is found in the ready-made mixtures. The seeds of both Chewings' Fescue and Creeping Bent are subject to adulteration with very similar seeds, and in mixtures the adulteration is more difficult to detect. With a knowledge of the facts concerning the various bents and fescues, and by buying each separately from a reliable seedsman, the chances of securing the desired varieties are greatly increased. Granting for the moment that mixtures are desirable for the putting-green, seed of the component species should be purchased separately for quality's sake, and since the question of exact proportions is of little importance, any one with a reasonable degree of intelligence can compound a mixture with the proper constituents that will be at least as satisfactory as those that are offered in the trade.

The whole question as to the use of mixtures requires discussion. Why are mixtures ever employed? Chiefly perhaps because of a long-standing practice in agriculture. Even nature herself seems to furnish an adequate reason through example. Mixed plant associations are the rule rather than the exception. The advocates of mixtures

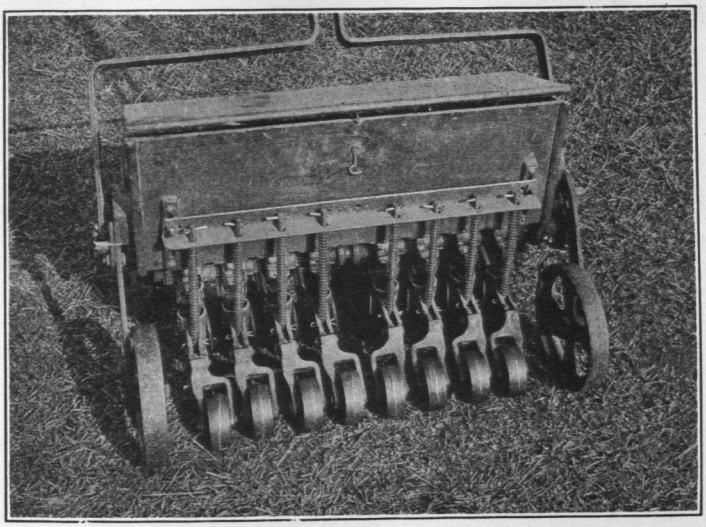

PLATE VIII. — Upper. "Cut-in" seeder, a useful implement to plant seed in turf.

Lower. Sowing seed on a putting-green with a cut-in seeder.

for putting-greens, therefore, have reasoned largely from analogy and somewhat along the following lines. Species vary in their range of adaptation to soil and climate; consequently, it stands to reason that, using several or many together, the chances of securing good permanent turf are correspondingly increased. For ordinary lawns the mixture idea undoubtedly possesses merit, but on putting-greens there is reason for a different view. If there is such a thing as standardization of soil conditions, it is certainly to be found in the case of the modern putting-green. Variation in soil is reduced to the minimum, and conditions are made as uniform as possible, thereby doing away with the main prop of the mixture theory. As for climatic requirements and habit of growth, the valuable species have never been known to produce what may be called a supplemental effect in either respect when grown together. That is, one species does not make the turf at one period, and the other one subsequently. The critical period of the year of one species is essentially the critical period for most others. Thick turf can be secured as readily from the use of these species singly as in mixtures. Apart from the lack of any conclusive evidence in favor

of mixtures on putting-greens, there are some valid objections to them. Uniformity of texture is one of the first requirements of a putting-green turf, and while various factors influence this characteristic, it is to a considerable degree dependent on the nature of the species of which the turf is composed. Since Chewings' Fescue and Creeping Bent are appreciably different in texture, the practice of mixing the seed of these species for putting-greens would seem to be in violation of one of the fundamental principles of green-making. Chewings' Fescue and Creeping Bent do not produce a uniformly mixed turf, but after a few years a patched one composed of small and large areas of each growing separately. Such a condition is certainly not conducive to uniformity of texture.

Uniformity of color is likewise sacrificed through the use of mixtures, a matter which is of course only of æsthetic importance. If the chances of maintaining a thick permanent turf could be increased by mixed seeding, uniformity of texture might be sacrificed to some extent and uniformity of color entirely, but there is lack of evidence to show that mixed seedings are helpful in this respect.

From the standpoint of economy the arguments

are all opposed to seed mixtures. If there were an adequate basis for carefully compounded mixtures, golf clubs might be justified in paying the higher price at which mixtures are held, but since this adequate basis does not exist, it is economy to buy seed of each species separately. This is the case, not only because the club can save money by so doing, but also because it will be more likely to secure a better quality of seed.

There is no mystery about the commercial origin and characteristics of the seed of Creeping Bent and Chewings' Fescue, as well as the other seeds which sometimes have been substituted for these. No one seedsman has any advantage over the others in the purchasing of these seeds. Chewings' Fescue as it is exported from New Zealand contains, as a rule, but a small quantity of impurities. Creeping Bent has more impurities, but they are not of a serious nature. The only advantage that one seedsman can have over another, then, would be in the matter of recleaning, but Chewings' Fescue is notably clean and pure, while the cost of Creeping Bent is such that recleaning is seldom practiced, because of the necessarily large loss of seed.

It must be admitted that good putting-greens

composed of a mixture of Creeping Bent and Red Fescue are found on many golf courses. The best of these, however, are certainly no better than the best greens composed of either of these grasses alone. In short, there seems to be no argument why the use of these two grasses in mixture should be preferred to either one alone.

Where two grasses occur in sequence on a putting-green, one in summer and the other in winter, the use of both cannot properly be designated a mixture. Thus in the South the turf on putting-greens in summer may be Bermuda-grass and in winter Italian Rye-grass or some other winter grass. In some localities Annual Blue-grass makes a perfect turf on Creeping Bent putting-greens from late fall till early summer. This grass may not be particularly welcome, as it may injure the Creeping Bent, but on the other hand it does provide an excellent putting surface.

GRASSES FOR FAIRWAYS

Turf for fairways need not be nearly as fine in quality as putting-greens, but on many courses there is a growing tendency to use the finest turf grasses, namely, Creeping Bent and Red Fescue.

It is doubtful whether this is wise from the standpoint of economy, and it is certainly open to serious question whether these two grasses possess for fairway purposes more desirable qualities than the more easily grown, slightly coarser grasses such as Blue-grass and Redtop. On the other hand, there can be no objection other than these mentioned to using Creeping Bent or Red Fescue on fairways, providing they will thrive without excessive care.

Many golf courses have been constructed on land already in grass, and the fairways on such were usually part of this original turf. The common turf grasses on old pasture land in the North are Kentucky Blue-grass, Redtop, and White Clover, excepting in New England, where Rhode Island Bent is predominant. Of course there are always other grasses mixed with these, but they are rarely abundant enough to give character to the turf. In the South permanent grass land is mostly Bermuda-grass more or less intermixed with Japan Clover, except along the Gulf Coast and in Florida, where Carpet-grass tends to be predominant. In the Great Plains regions numerous short grasses, especially Buffalo-grass and several Mesquite grasses, make up the natural turf.

Generally speaking, the turf grasses above mentioned which tend to hold their own on the land are most easily utilized for fairways, and all of them provide a satisfactory turf. The improvement of this established turf is usually much less expensive and more satisfactory than to plow the land and to seed new grasses.

On land that is not already in grass or where the turf is so weedy as to be undesirable, the preparation of the land for seeding is necessary. This preparation should consist of good plowing and thorough harrowing so as to make a fine, firm seed-bed. An excellent implement to give the seed-bed a fine, even surface is the smoothing harrow. If possible, a heavy application of barnyard manure should be made before plowing. In the absence of barnyard manure, such organic fertilizers as bone-meal or cottonseed-meal are preferable to chemical fertilizers. Any of these are best applied after plowing but before harrowing.

If Blue-grass is to form the basis of the turf on the fairway, liming is also desirable, using preferably two tons of fine ground limestone to the acre. Bermuda-grass and White Clover are also helped by the use of lime, but other turf grasses are scarcely affected.

Crab-grass is sometimes very abundant on fairways in summer and makes a very satisfactory but rather coarse turf. The principal objection to it is the danger of the seeds being carried to the putting-greens, and the rather unsightly appearance of the turf after the first killing frost. No matter how thick the Crab-grass may be, the perennial grasses usually recover and begin growth again after the Crab-grass dies.

When the ground has been prepared for seeding, the sowing should in the North be in the fall, September being the best month. Heavy seeding is advisable. The seed should be broadcasted both ways across the land and then followed by a light roller.

The important turf grasses to sow on fairways are as follows:

Kentucky Blue-grass. — For use in the North generally. Seeding should be done in September, using 150 pounds of seed to the acre. Liming is beneficial.

Redtop. — Generally useful in the North. Seed in September, using 40 pounds of "recleaned" seed to the acre. Liming is not particularly beneficial.

Rhode Island Bent. — The common natural turf

grass in New England. Seed in early fall, using 40 pounds of seed to the acre. Liming is not beneficial.

Red Fescue. — Well adapted to New England and the northern tier of states. Seed in September, using 100 pounds of seed to the acre. Liming is not markedly beneficial.

Creeping Bent. — Use as recommended for Redtop, but the seed is expensive.

White Clover. — Useful in the North, especially on very poor soils. Sow in September, but only in mixture with a grass, using 5 to 10 pounds of seed to the acre.

Bermuda-grass. — The principal fairway grass of the South. It may be propagated by seed or by cut-up turf. Seed or plant preferably in early spring, but the turf method may be used any time during the growing season. Liming is beneficial.

Carpet-grass. — Useful along the Gulf Coast and in Florida. May be propagated by turf any time during the growing season. Seed is rarely procurable unless harvested especially, but if available, seed in early spring. Liming is not beneficial.

Japan Clover. — Useful in the South on very

thin or poor land. Seed in early spring with 1 to 2 bushels of seed to the acre. Liming is helpful.

Italian Rye-grass. — Valuable for sowing on Bermuda-grass turf in the fall, so as to make a greensward for winter and early spring. Use 120 pounds of seed to the acre.

For fairway purposes, mixtures of some of the above grasses are very satisfactory and under ordinary conditions give superior results to any single grass. The commonest of these mixtures is that of Kentucky Blue-grass and Redtop, using four times as much seed by weight of the former as of the latter. White Clover also mixes well with these two grasses, and if desired, the proportion of this seed mixture by weight should be about 16 pounds Blue-grass, 4 pounds Redtop, and 1 pound White Clover.

Creeping Bent or Rhode Island Bent, and Red Fescue, also mix fairly well, and where such fine grasses are used on fairways, the mixture is usually superior to either one alone. About 6 pounds of the fescue seed should be used to each pound of bent seed, to obtain an equal number of plants of each.

Yarrow may be sown if desired in the Blue-grass and Redtop mixture. Japan Clover does well in

Bermuda-grass. Italian Rye-grass makes the most satisfactory green winter turf to alternate with Bermuda-grass.

GRASSES FOR THE ROUGH

It is generally agreed among golfers that the penalty for a shot into the rough should be no more, and seldom less, than one stroke. As a rule the rough should be of such character that the player is forced to use a mashie or other club with considerable loft.

On most courses no attempt is made to seed grasses for the rough, those that come naturally being depended upon. In general the best type of grasses for the rough are those which form heavy, and rather tall, tufts. Grasses which make a dense continuous mass of stems make it troublesome to find the ball, and in some cases the growth is so dense that it is difficult to make a stroke even with a heavy niblick. This makes an unfair penalty to the player.

In the East and South several species of Broom Sedge (Andropogon) are very common native grasses. Broom Sedge is an almost ideal grass for the rough, as it grows all summer and does not

mature till late fall. The tufts are usually scattered a foot or two apart, so that it is not particularly difficult to find the ball, and there is nearly always a fair chance to make a moderate shot with the niblick or mashie. On most untilled land along the Atlantic Coast and in the South, Broom Sedge is sure sooner or later to make up much of the grass cover.

Among the cultivated grasses Orchard-grass and Tall Oat-grass are very satisfactory. Both will thrive well over a large part of the United States. They are especially advised where the natural grasses do not make a suitable rough.

Orchard-grass properly seeded fills the requirements well. It is a hardy perennial, suited to a great variety of soils, ranging from light sand to poor, stiff clay. In the character of its growth it resembles Broom Sedge very closely. On hilly slopes that wash badly, Orchard-grass is valuable for binding the soil and preventing erosion. Because of its wide range of adaptation, its suitability, character, and longevity, it is one of the best of our cultivated grasses for the rough.

Tall Meadow Oat-grass has much the same bunch-forming habit as Orchard-grass, but is taller and

slightly less coarse. In soil and climatic requirements, the two species are much the same, and a combination of them frequently gives better results than either alone. In fact, a mixture is usually to be preferred to a single species for the rough, and to the combination of Orchard-grass and Tall Meadow Oat-grass, Timothy and Meadow Fescue may well be added in small quantities to offset the bunching tendencies of the first two species.

On very sandy land Sheep's Fescue and Hard Fescue are probably the best grasses for the rough. Neither of these grow tall, but they make very tough tussocks of grass that hold the soil firmly, and the cuppy lies between these tussocks seldom permit a player to secure a full shot.

For growing on sandy mounds about bunkers, Sea Lyme-grass (*Elymus sabulosus*) is very showy and satisfactory. This grass is coarse and with attractive bluish leaves. It spreads and is propagated by creeping rootstocks which can usually be obtained from nurserymen.

Marram-grass (*Ammophila arundinacea*), so commonly planted along sandy coasts to hold the drifting sands, is also used on sandy golf courses for the same purpose.