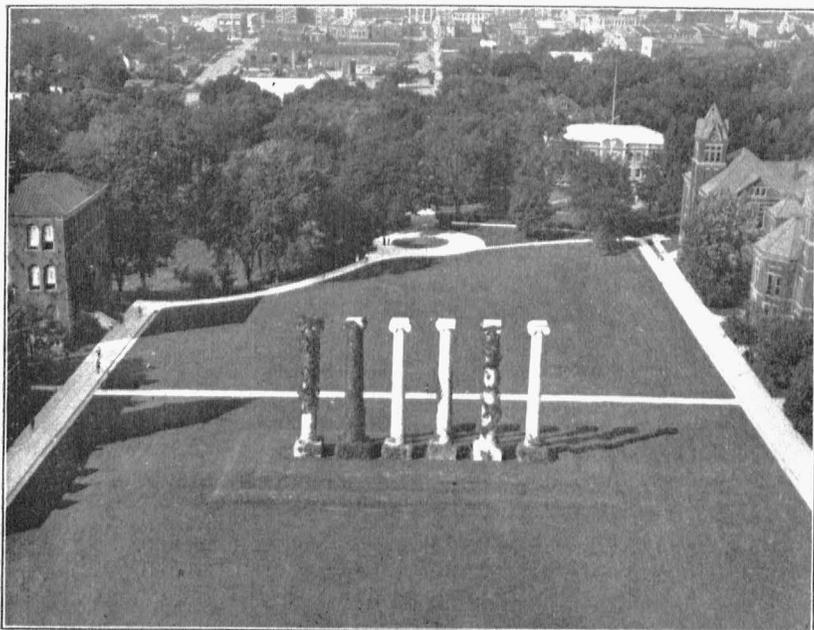


# Lawns and Lawn Making

HORACE F. MAJOR



Lawn on West Campus, University of Missouri.

The art of lawn making is not so simple as the average person would like to believe. Always a lawn has been the first step in the improvement of home grounds, and later the most desired setting for the house or public building. We may describe the lawn as the one satisfactory foreground and base of every landscape. Everyone who wishes to develop or maintain a beautiful lawn must inform himself of the many points involved toward its accomplishment.

By a lawn we mean an area of ground covered with grass to be maintained in a sheared or closely clipped condition. There are two types of

lawns that must be discussed, since there is a variation of the practical treatment to be given: (1) the new lawn, and (2) the old lawn.

### NEW LAWN MAKING

When a new building is completed or when a cultivated area is to be put into lawn, the first question that arises is that of preparation of the soil. Since the soil is the foundation of the lawn and must supply the plant growth with proper and sufficient food for an indefinite period of time, it is essential that we examine its condition and bring it to a proper state of fertility before attempting to do the seeding.

**Grading.**—Grading for lawns involves the shaping of the ground to provide proper drainage and to give a pleasing appearance. Any rich soil well drained will produce a good lawn, but due consideration is seldom given to these requirements in the early stages of the work. Too often in excavating for a building a heavy subsoil impervious to moisture and devoid of plant food is thrown out and spread around to become the foundation of a lifelong stand of grass. This inevitably means failure. Also there is frequently imbedded in this soil a considerable quantity of trash such as pieces of board, wire, cement, stone or brick chippings and other debris. By all means this should be removed before attempting to develop the lawn.

All areas that are to be sown to grass should have at least 6 inches of good topsoil on the surface. So before excavating for any buildings or changing the grade at any place, the top soil should be scraped off to a depth of approximately 8 inches and piled to one side for future use. Then after the cuts and fills have been made to establish the subgrade, the topsoil may be spread again over the entire surface, bringing it up to the finished grade. If the existing surface soil is not suitable for finishing, a sufficient quantity should be secured elsewhere.

The most satisfactory grade from the standpoint of drainage, general appearance and later maintenance is a gentle slope extending from the foundation of the house away to the boundaries of the yard. Sometimes this ideal slope is not possible in all directions, but the following advice should be carefully adhered to at all times.

(1) There must be no hollow places in the lawn area that will collect water.

(2) Water must not be allowed to drain toward the house or other buildings. Downspouts often empty near the house foundation. It is well to provide definite surface drains for this purpose. A fall of  $\frac{1}{4}$  inch to the foot away from the buildings will, in most cases, be satisfactory.

(3) Avoid terraces and terrace slopes wherever it is possible to develop a gentle sloping or undulating lawn area. Terrace slopes are costly

both to develop and maintain and tend to produce a super-artificial effect of landscape about the house. On the other hand avoid absolutely level lawns, for unless the place is very small they appear monotonous and permit of less interesting landscape treatments later.

**Method of Soil Preparation.**—The first step in soil preparation is a deep, thorough plowing. Especially is this desirable if the soil is a heavy clay or clay loam, as it tends to produce proper aeration and pulverization and to induce a sort of capillary action of subsoil moisture so that it rises to the surface, greatly aiding the development of the seed. Frequently, if the soil is unusually tough or has been much packed, additional pulverization is accomplished by rolling. Rolling is equally valuable in compacting to the proper consistency soil which is normally too

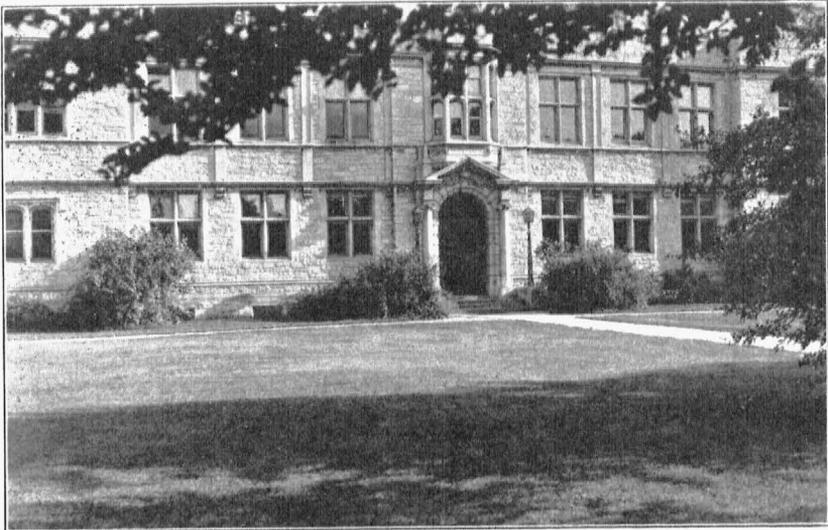


Fig. 2.—Lawn on East Campus, East Agricultural Building, University of Missouri. This bluegrass lawn was practically cleared of heavy dandelion growth in one season by applications of leaf-mold, 300 pounds to 100 square feet.

loose. It may be said that *rolling* is indeed one of the essential factors in improving soil conditions for lawns both before and after seeding.

If the ground to be used is quite poor and heavy or very weedy, the above operations should be performed not only just before planting but also in the late summer or early fall of the preceding year, if possible. When the operations are repeated the following spring, just before seeding, it will be found that the soil is free of annual weed seeds, which have not had time to ripen before freezing, and that the soil texture and consistency has been greatly improved by freezing and thawing.

If the ground is prepared only in the spring, one should plan to give two or three cultivations before sowing the grass seed. The valuable effect of this practice is to destroy many annual and perennial weeds.

**Levelling.**—It is now time to level up the yard. By this is meant filling in any irregularities that occur in the general surface such as ditches produced by the plow or sink holes resulting from the removal of debris. If the yard has been filled with clay it is best to cover it with a topsoil about 6 inches deep. If this is not available, however, one should spread over the top a heavy coat of thoroughly rotted stable manure. It is wise at this stage of the proceedings to disc the ground with a disc harrow, cutting both ways several times until the manure and soil are thoroughly mixed. A drag or iron rail may then be used to help smooth and level the area. A harrow is often desirable, also, when used with the teeth lying slightly back, to bring stones and debris to the surface so that they can be taken away to the dump. The harrow leaves slight ridges or grooves in which seed will collect and be held easily. On small yards hand raking may be substituted for the use of this toothed or "smoothing" harrow, and this method usually produces a fine surface for seeding.

### SEED AND SEEDING

The seed used is indeed an important factor in producing a fine lawn; also the conditions accompanying the seeding process. First the necessary requirements must be carefully considered. For proper germination and growth, the requirements are (1) viable seed, (2) a good, mellow soil, (3) warmth supplied by sunlight and (4) moisture.

These requirements are essential not only at the time of sowing the seed but must be present for approximately thirty days following. It will be seen, therefore, that lawn seeding may be done at any time when these factors are present or prospectively available.

**Seed.**—The seed should be of the proper variety or mixture of varieties for the kind of lawn desired and its geographical location. High quality and high percentage of germination are essential. It should have grown during the current season in some part of the country where it had a chance to develop and ripen fully. Good seed has the following qualities:

- (1) Free from foreign material and weed seed;
- (2) High in percentage germination, usually 92% to 95%;
- (3) True to variety and standard in weight per bushel;
- (4) Produced comparatively near your section of the country;
- (5) Not more than one year old.

**Plant Foods.**—One should be sure in the preparation of the seed bed that certain plant foods are available. An acid soil should be limed.

After the lawn is established it is both unwise and unnecessary to use lime. It should never be used in the form of crushed limestone, but should be worked well into the soil a year before seeding in the form of air-slaked lime. The lime may be slow to take effect and is used only on sour soils where it has been impossible to secure a stand of grass.

Phosphorous is lacking in most soils as a rule, and must be supplied by the application of some commercial fertilizer with a relatively high phosphorous content. A lawn soil should, by all means, have a high availability in nitrogen also, a condition usually present if the soil is rich in humus. Nitrogen can be supplied by applications of well rotted stable manure, but unless carefully selected this often brings weeds. One of the best sources is decayed leaves or, as it is often called, "leaf-mold". It is a great pity that so many leaves are burned each year instead of being rotted in pits for application to lawns. Some of the advantages of leaf mold are as follows:

- (1) It is rich in humus and nitrogen.
- (2) It contains no weed seeds and does not draw flies.
- (3) It is odorless and light in weight, hence easily applied.
- (4) It is not unsightly when applied to old lawns.
- (5) A little of it goes a long way in results.

Commercial fertilizers are of value when properly applied and usually are more easily obtained and distributed than stable manures. We mention in this connection the complete mixed fertilizers, bonemeal and dried blood, and pulverized sheep or cattle manure. Good results have also been obtained from the use of cotton seed meal.

**Warmth and Moisture.**—Warmth and moisture are essential to germination of the seed. Consequently, sowing is usually done in the spring or the early fall, though it may be done between these seasons when right conditions are present. It is best to select a moist, slightly cloudy and quiet day for seeding. Extreme heat or heavy winds are not conducive to good condition or distribution of the seed. In Central Missouri seeding is usually done following the middle of March or as late as October 1. In the north part of the State it should be done ten days or two weeks later in spring and some time during late August or early September for fall planting. The seasons in the southern parts of the State are ten days or two weeks longer at each end.

**Distribution of Seed.**—On very large areas the seed may be drilled in by farm or motor drills; but in general the old fashioned broadcast method is very satisfactory. The popular "knapsack broadcaster" or horn seeder, consisting of a seed sack which hangs from the shoulder and which feeds into a long tube with fanlike partitions at the end, is one of the easiest means for securing an even distribution of seed. The sower walks along at a regular pace and swings the tube from side to side, sow-

ing the seed heavily in two directions. It is well worth while to obtain such a seeder where one has more than a half acre to sow.

Following the distribution of the seed on small lawns, it is well to "rake" it in with an iron rake carefully and evenly. Then, if desirable, a light coating of well rotted manure may be spread carefully and evenly over the surface.

It is important after seeding that the ground be rolled with about a 300-pound roller. The rolling should be done when the ground is not wet, so that the dirt will not stick to the roller. For best results the ground should be thoroughly watered within 24 hours after rolling. A good roller may be made from a piece of 20-inch vitrified tile with the collar cut away. The tile is set up on end on the ground and a ½-inch gas pipe 8 inches longer than the tile is placed in the center and driven 4 inches into the ground, thus leaving 4 inches standing above the top of the tile. Then the tile is filled with a good mixture of well tamped concrete. When this is well set and the tile is turned on its side and equipped with rope or wooden handles attached to the projecting pipe ends, it will be found a very satisfactory 300-pound roller for moderate sized lawns. For very large lawns where the use of a horse-drawn roller is practicable, it is less expensive to buy a commercial roller.

**Cutting.**—New grass need not be cut until it has reached a length that will not stand upright. The first cutting may well be left on the ground as a mulch. It will rot quickly and at the same time keep the ground moist and the young grass protected.

**Watering.**—It is well to remember that artificial watering should be resorted to only when necessary to preserve moisture and then it should be applied in a very considerable quantity. Frequent small applications of water are undesirable.

**Seed Varieties and Mixtures.**—It is difficult to make a general recommendation of a single mixture of lawn grass seeds which will meet all requirements for Middle Western conditions, and especially for a state like Missouri, where there are many types and conditions of soil and considerable difference in latitude. All of these conditions may reasonably permit of some differences in combination or amount of seed. It is intended, then, to recommend a mixture that as nearly as possible adapts

TABLE OF STANDARD WEIGHTS OF GRASS SEED PER BUSHEL

Bluegrass (Canada or Kentucky)	14	Meadow fescue (or Cheving's red fescue)	25
English or perennial rye grass	24	Meadow foxtail	10
Red-top	14	White clover	60
Timothy	45	Red clover	60

itself to Central Missouri, including at least a radius of 200 miles, with a few suggestions regarding additional seeds to be added or omitted under specific conditions of climate and soil.

For the most part, bluegrass is the best foundation for lawns in the United States, particularly in the Middle West. Except in the far South or arid regions it is very satisfactory. However, it is usually not sown alone, for the reason that when young it needs protection. Its use is recommended as follows:

A. For *general lawns* about the home grounds.

Bluegrass, 1 bu.....	14 lbs.
English or perennial rye grass, $\frac{1}{4}$ bu.....	6 lbs.
Redtop.....	5 lbs.
White clover.....	2 lbs.
Total.....	27 lbs.

With the above mixture one should sow on new ground about 55 or 65 pounds per acre. An acre is approximately 208 feet square. Where there is considerable shade or some damp ground in the yard, the amount of perennial rye grass may be increased to 8 pounds in the above mixture.

B. For *meadow type of lawn* on large country estates where the grass is not cut as often as on town yards, or where it is cut with a mowing machine or sometimes grazed by sheep, and for golf course fairways on links:

Bluegrass, 1 bu.....	14 lbs.
Timothy.....	10 lbs.
Redtop.....	5 lbs.
White clover.....	5 lbs.
Total.....	34 lbs.

This mixture is sown at the rate of about 50 to 60 pounds per acre. To this may be added 5 pounds of meadow fescue per acre.

C. For *pasture lawns* or "*roughs*" on golf links and areas cut about three times a season or grazed moderately by cattle or sheep.

Bluegrass, 1 bu.....	14 lbs.
Timothy, $\frac{1}{2}$ bu.....	23 lbs.
Redtop, $\frac{1}{4}$ bu.....	$3\frac{1}{2}$ lbs.
White clover.....	5 lbs.
Red clover.....	10 lbs.
Total.....	$55\frac{1}{2}$ lbs.

This mixture is sown at the rate of about 70 to 80 pounds per acre. To the mixture may also be added meadow or red fescue and foxtail in amounts of about 5 to 10 pounds each per acre.

D. For *finely matted grass* such as is desired on the putting greens of golf courses the following should be used:

- |                            |                  |
|----------------------------|------------------|
| Bluegrass.....             | } in equal parts |
| Western creeping bent..... |                  |

A small amount of redtop and sweet vernal may be added. Western creeping bent is one of the best of the northern turf grasses and is used at the rate of ¼ pound of Bent with 1 pound of redtop to 200 square feet. New seedings are best if lightly covered with well rotted screened manure about 1 cubic yard to 1,000 square feet. This should be raked lightly and rolled in two directions.

Some of the causes of deterioration of old lawns are:

1. Poor soil or too thin a layer of good surface soil.
2. Poor drainage or settling, resulting in irregular cutting.
3. Lack of reseeded.
4. Presence of old trees with roots near the surface.
5. Too many trees branching low, causing heavy shade.
6. Perennial weeds and undermining by pests.
7. Too rough and constant hard use—usually worn out by play of children or by animals.
8. Improper maintenance such as infrequent cutting or raking, or general neglect.

### MAINTENANCE OF OLD LAWNS

**Plant Foods.**—Soils become greatly depleted after being in lawn for a number of years without fertilization. When a thin, greenish moss grows on the ground, this may indicate a sour soil. Where the soil is sour, lime should be added to neutralize the acidity. It is generally best to apply this in the early fall in the form of air slaked lime, working it into the soil. It is well to remember, however, that lime and manures should not be applied at the same time.

Almost all soils are lacking in phosphorous and some in potash. These elements can be supplied in a complete fertilizer. Potash may also be applied in the form of wood ashes taken from the grate. Although this may be applied at any time if not put on in too large a quantity, it is best to apply it in early spring.

One of the most important plant foods that should be present in the soil is nitrogen. This is usually obtained from stable manures, which may, however, contain weed seeds. Therefore, many prefer to use commercial fertilizers high in nitrogen content such as nitrate of soda, ammonium sulphate and dried blood. Ground bone, which is high in phos-



phorus, and pulverized sheep, cattle or chicken manure that has been sterilized are all valuable, as a rule, when used on the lawn.

The use of leaf-mold is highly recommended. This is nature's own method and supplies both humus and nitrogen in a form available as plant food. If well rotted, leaves furnish a wealth of cheap plant nourishment. Leaves left in a pit for a year or so, screened and turned over, will form a mold like sawdust which is free of odor, draws no flies, is clean and easily applied and free from weed seed. It is also evident that a heavy application of leaf mold may help to drive out weeds, especially dandelions, from a lawn, increase the thriftiness of the bluegrass and apparently intensify its color.



Fig. 3.—Leaves in piles, rotting to become leaf-mold for dressing lawns.

When fertilizer is applied, it should be thoroughly raked into the old lawn with an iron-toothed rake. After a lawn is established frequent top dressings greatly improve it. One of the best is cottonseed meal which has an analysis of 7-3-2 and is almost an ideal complete fertilizer. Apply 6 pounds per 500 square feet at any time. This should be washed in with a hose or applied just before a light rain.

**Rolling.**—It is well to remember that with the sudden changes in temperature that occur in many parts of the Middle West, rolling the lawn frequently is an excellent practice. One should use a roller weighing from 300 to 500 pounds.

**Drainage.**—Where there is poor drainage, effort should be made either to underdrain, fill or regrade the lawn in such a way as to eliminate unusually damp places.

**Reseeding.**—Too many people expect a little seed applied to a lawn to produce a thick sod that will last and improve through a lifetime or more. They cut the grass frequently, thus eliminating self-seeding and depend upon the “spreading” of the grass by stolons and buds to keep the surface covered thickly.

Every lawn should have an occasional reseeding with freshly ripe and potent seed. Both bluegrass and redtop may be used for this, and the quantity necessary depends somewhat on the condition of the lawn. From 30 to 50 pounds to the acre may be applied every five to eight years. Before sowing, the old grass should be cut and thoroughly raked with an iron-toothed rake as deep as possible without pulling up the roots of the old grass. On bare spots, before reseeding, the ground should be either raked or, preferably, spaded up thoroughly. Usually, fertilizer or new soil is added. When the seed is sowed it should be raked into the soil.

**Trees.**—It is difficult to produce a good sod under old trees where roots are near the surface. It is practical, often, to spade up the ground and remove most of these roots without injuring the trees. In very shady or damp places, the English rye grass spoken of in a previously described mixture will be found effective in helping to re-establish the lawn. Low limbs of trees or some foliage may be removed to let sunlight and air to the ground for the benefit of grass under the trees.

**Weeds.**—Where perennial weeds occur, about the only satisfactory way to be rid of them is to dig them out root and all. If the roots are not removed, they may grow up again. Many sprays, oils and instruments are advertised for removal of such weeds, but the most effective manner of extermination is by constant close cutting and continuous hand digging. Soil and grass seed should be added in places where these are removed.

**Excessive Wear.**—While a certain amount of tramping is good for grass, it can be overdone and it may be necessary to discontinue use of a piece of ground until the grass becomes reestablished. This is true on athletic fields and school grounds and in certain places in parks. The grass should be left to grow and mature, if possible, for a whole season, allowing it to reseed itself when the season permits. Additional seed should also be applied. On pasture and meadow lawns, too close grazing may ruin a stand of grass and this should be watched and animals removed to other pasture at least temporarily.

**Cutting.**—Early spring cuttings may be left to decay, but after the month of May, in general, cut grass should be raked up and removed.

The "set" of the lawn mower is important. Where grass is thin it should not be cut too close. On thick sod one may cut fairly close and often. Previous to probable dry weather and hot winds or to a probable cold, dry fall and winter, grass should be allowed to grow long. This will protect young shoots and roots from burning out in summer or from freezing in winter.

Close to trees the grass should be cut away with hand shears, or else the space about small trees kept cultivated. Avoid striking the base of tree trunks with the lawn mower as this may injure and eventually destroy the tree. Edging of walks and shrubbery beds greatly improves the appearance of neatness.



Fig. 4.—(A) Screen used in separating undesirable material from collected leaves. (B) Screened leaves ready to be stored in a compost heap for decay. In two years the decayed leaves should be ready for use on the lawn.

**Tools.**—The yard tools should be kept in good condition. A mower that haggles the grass or skips in cutting is apt to ruin the appearance of a lawn permanently. Remember that the lawn mower should be set to cut at different heights through the summer, depending on climatic conditions.

**Watering.**—Frequent artificial watering in small amounts is bad for a lawn. When water is applied, it should be in sufficient amount to wet the soil to a depth of about 2 or more inches and then not applied again until danger of drought occurs.

It is quite normal for bluegrass to turn slightly brownish in dry weather, but as a rule it recuperates quickly after a light rain.

**Pests.**—The presence of moles or ants in a lawn usually results in loose soil or bad moisture conditions. Ants may be suffocated with hydrogen bisulphide gas and by cyanide gas. Place these chemicals on the hill in moderate amounts and cover with a sack or cloth to prevent the escape of the gas formed. Another method of extermination is consistent rolling of the ground, which will usually drive out moles, though sometimes one must resort to the mole trap or poison baits.

The control of the pocket gopher is adequately discussed in Extension Circular 146, of the Missouri College of Agriculture. It may be had on request.

### SYSTEM OF LAWN FERTILIZATION OVER A PERIOD OF YEARS

It is advisable to plan a system of fertilizing the ground over a series of years, using a different one each season until the lawn soil is thoroughly built up to a point of high fertility. The following suggestions will be found beneficial in determining the amount of fertilizers to be applied to lawns:

**On Newly Plowed Ground.**—Barnyard manure should be applied at the rate of from 15 to 40 tons to the acre, depending upon the fertility of the original soil.

**For Established Lawns.**—For top dressing established lawns any of the following fertilizers may be used. The amount specified in each case is sufficient for 500 square feet of lawn.

(1) Well rotted, screened stable manure, 500 pounds. To this may be added either nitrate of soda 5 pounds, or ammonium sulphate 5 pounds. A month later, another 5 pounds of either nitrate of soda or ammonium sulphate should be spread over the lawn and washed in with a hose, or made into a solution at the rate of 1 pound to 10 gallons of water and sprinkled on the lawn.

(2) Commercial fertilizer, 6-8-4 formula, 8 or 10 pounds.

(3) Mixture, 8 pounds, made up of sulphate of ammonia  $2\frac{3}{4}$  pounds, 16% acid phosphate 5 pounds, and muriate of potash  $\frac{3}{4}$  pound. Apply as soon as mixed and leach in with a hose.

(4) Leaf-mold, rotted and screened, 100 pounds.

(5) Cotton seed meal, 6 pounds.

(6) Pulverized sheep or chicken manure, 100 pounds.