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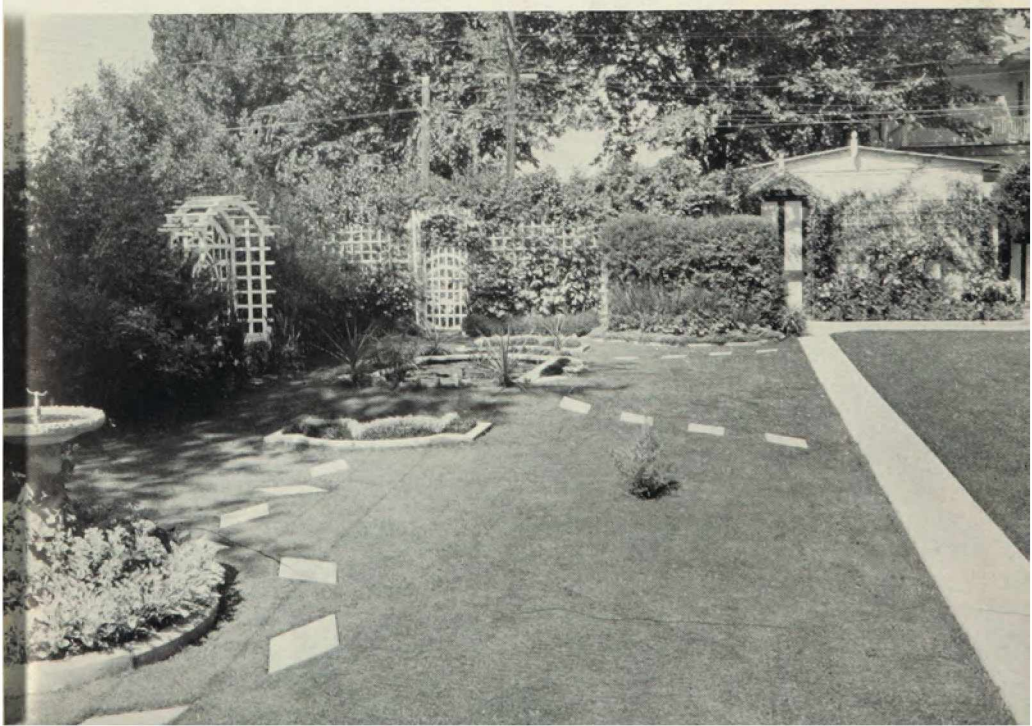
March 1938

Planting and Maintaining
Colorado Lawns

GEORGE BEACH



2) Agricultural
Colorado State College
Colorado Experiment Station
Fort Collins



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Planting and Maintaining Colorado Lawns

GEORGE BEACH

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AN UNUSUAL appreciation of the value of well-planned and well-maintained lawns as a feature of home grounds is apparent upon the part of Colorado people. The thick, velvety texture of well-kept, high-altitude lawns of Colorado homes has long been a matter of comment. For the time, money, and effort required, few improvements can be added which will pay greater dividends in satisfaction and in actual increase in property values.

It goes without saying that considerable time and labor are necessary to keep a yard clean and weed-free if no lawn is planted. So little extra work is required to sow and care for the lawn that the effort is amply rewarded by the increased satisfaction of its neat and tidy appearance. It must be clear at the outset, however, that green-tinted concrete is the only laborless substitute for lawn.

The question is often asked whether there is not some lawn grass for Colorado, other than the commonly grown Kentucky bluegrass, that would require less sprinkling and mowing. Lawn has been defined as "closely-cut greensward" and as "ground covered with grass and untiled." Under the latter definition our native prairie grass might qualify as lawn; but even at its best, prairie grass is not the kind of turf we usually think of as lawn.

In the yards of some prairie farm homes where a "closely-cut greensward" is not practicable, a good ground cover can be made by using native grass. This grass is also the foundation of many prairie golf courses.

BUFFALO GRASS, *Buchloe dactyloides*, is a long-lived perennial stoloniferous grass which is an abundant major component of the native grassland in eastern Colorado. Though it is highly drought-resistant, the judicious use of water in starting it and during periods of excessive drought is a material help in keeping it attractive from May until fall frosts come. It is not yet practical to establish this grass by seeding because of scarcity and expense of collecting seed.



Figure 1.—A well-graded surface is most desirable for starting the new lawn; note the depth of excavation for filling in with good top soil.

Excellent results have been obtained in transplanting sod cubes of blue gramma, buffalo grass, and western wheatgrass on bare soil at Fort Collins, according to Prof. E. W. Nelson, of the Range and Pasture Management Section of the Colorado Experiment Station. Complete cover was established in 2 years of sub-normal rainfall from sods spaced a foot apart in 2- and 3-foot rows. Six-inch cubes are recommended for the sods. They should be set as early as possible in spring, preferably after a heavy rain. (See figures 4 and 5.)

Land should be carefully graded and well prepared. If the sods are set a little below the surface level, they are better able to benefit

from light rainfall. All the soil should be packed firmly after planting to avoid exposure of sods and to prevent undue erosion while the grass is becoming established.

Cultivation is harmful, as it loosens runners and encourages erosion. Clipping at a 2-inch height is beneficial, as is also top-dressing with soil after the grass has become established.

Grading

There are many places where a perfectly level lawn is the only practical grade; but where conditions permit, a rolling but well-drained surface is the most pleasing and natural. Large expanses of perfectly level lawn give a stiff, strained effect which is never found in nature.

If there are soft spots after putting the ground to grade, rolling is necessary to detect low places. Depressions readily seen then may be filled by raking. Re-rolling and re-raking will insure good surface drainage.

Time for Sowing

If plenty of water for sprinkling is available, the very best time of year to sow lawn grass is from August 15 to September 15. "Getting the jump" on weeds is the important point in late summer or fall planting, for the sod developed before winter is able to compete with the next spring's weeds much more favorably than is that from spring-sown seed.

Sowing may be done more or less satisfactorily at any time of year. We even hear of grass seed sown on snow. This is rather a hit-or-miss practice but will succeed if the seedbed under the snow is in good condition; however, nothing is gained by waiting for snow after the ground is prepared.

If fall sowing is impossible, the next best time for sowing is early spring. March is preferable to April if the ground can be properly prepared that early.

Early spring weather is likely to be cold and damp, causing slow and irregular germination of grass seed. In late spring or in mid-summer the weather is usually too hot for the best interests of grass seedlings, and sprinkling several times daily as well as shading with straw or burlap is necessary to prevent the surface crusting that kills so many seedlings.

Late summer and early fall are seasons when Nature sows her grass. At these times heat is less intense, and the approach of cool days encourages deeper rooting and moderate leaf growth. The oppo-

site situation prevails in spring when weather is warming instead of cooling, thus encouraging too few roots, with an over-abundance of leaves.

Soil Requirements

Lawn may be grown on the subsoil piled over a yard from an excavation, but starting and maintenance are more difficult than when the surface soil can be restored after excavating. If planting the lawn



Figure 2.—Gradual drainage away from the house is preferable to flat lawn; note fineness of pulverization in seedbed.

is anticipated before building, the removal of 4 or 5 inches of surface soil before excavating, to be subsequently spread over the poorer soil, is an effort well worth while.

If the damage of covering good surface soil with subsoil is already done, working a heavy application of well-rotted manure into the upper foot of soil is a good practice. If the lawn is to be planted on a light, sandy soil, a dressing of a few inches of clayey soil, in addition to the manure, can be used very profitably, as the clay will increase the water retention of the soil. If clay is not worked into a very sandy soil, almost continuous sprinkling will be required to keep it in proper condition during warm months.

Soil Improvement Prior to Planting

Few soils are so good as not to be benefited by some system of soil improvement. In general there are three such systems: The sowing and subsequent plowing under of a soil-improving crop, such as oats, rye, clover, or vetch; the working into the soil, or addition after sowing, of well-rotted manure, peat, or other materials of high organic matter content; and the use of commercial fertilizers.

The first method, plowing under a cover crop, is called green manuring. If soil lacks humus and is of poor texture generally, it will be considerably improved by the planting of a cover crop in spring which is plowed under a month or 6 weeks before sowing the lawn.

In the large majority of cases a liberal application of well-rotted manure (100 pounds to 100 square feet) worked well into the soil will furnish all the plant nutrients necessary and besides will increase the soil's capacity for water retention because of the amount of humus it furnishes.

Commercial fertilizers, if used, should be in the "complete" forms, unless there is known to be a deficiency of certain elements. Two and one-half pounds to 100 square feet before sowing is a moderate application of complete commercial fertilizer under average conditions. One pound on the same area of established turf is a good average application. These fertilizers are easily applied, are readily obtainable, carry no weed seed, and supply concentrated plant foods; but they must not be depended upon to improve the physical condition of soils. (See also "Fertilizers.")

Lime is not necessary on western soils, as acidity is not a soil problem here.

Varieties of Lawn Grass

KENTUCKY BLUEGRASS, *Poa pratensis*, is the foundation of most successful Colorado lawns. This grass has a rich green color, its crowns are close to the ground, and after it is established it spreads rapidly by underground shoots.

WHITE CLOVER, *Trifolium repens*, is used in many lawn mixtures. It starts rapidly—ahead of bluegrass—and furnishes ground shade while slower grasses are getting started. Bluegrass then will gradually crowd out the clover.

PERENNIAL RYEGRASS, *Lolium perenne*, is a short-lived perennial, coarse in leaf and stem, which starts rapidly and produces early effect as well as covering quickly ground that would otherwise support weeds. The use of this grass coarsens the lawn the first year, and it is useful only where quick effect is more desirable than fine appearance.

REDTOP, *Agrostis palustris*, grows better under adverse soil and moisture conditions than most varieties of good turf grasses. It is a

finer grass than rye but seldom is used by itself for lawn. When mixed with clover and Kentucky bluegrass, it helps to give a good effect the first season but is gradually crowded out.

CREEPING BENTGRASS, *Agrostis maritima*, is the type of grass commonly used on putting greens of golf courses. The many varieties in trade necessitate careful selection when buying. The creeping stems or stolons of this grass take root at the joints or nodes and make a

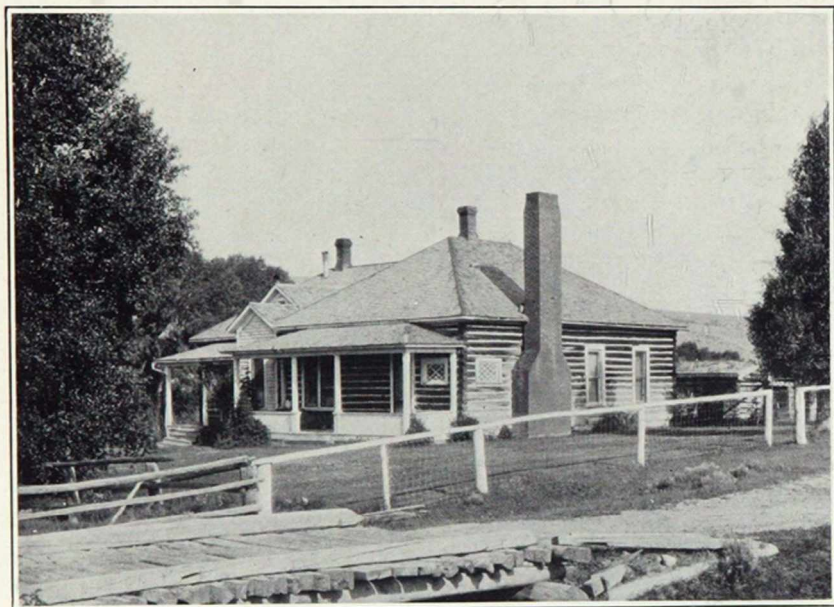


Figure 3.—This mountain home is even more attractive by virtue of the pleasant lawn.

very dense mat of sod. Seed of this species is much more expensive than seed of good bluegrass; this grass should be used only by those who are willing to give the lawn the care and study that a putting green merits. Chopped-up plants or stolons also may be had for planting in rows or for broadcasting. This material is costlier than seed but makes sod more quickly. Here again, careful planting and judicious buying are essential to success.

Bentgrass has a logical place in grass-seed mixtures, especially for turfs receiving hard wear. When used alone, however, bentgrass flourishes in soils of slightly more acid reaction than most of those occurring naturally in Colorado. It is often difficult and expensive to maintain an acid reaction in our soils.

Bentgrasses are a very special type of turf and are confined, even at the best golf courses, to the putting greens, while Kentucky bluegrass furnishes the much larger area in fairways. It has been said that less water is required for bentgrass and that its close mat of growth chokes dandelions. These advantages, however, are small. Bentgrass lawns need nearly as much water as other lawns; and dandelions do almost as well in them, if given a chance. A special mower is necessary to do good work on bentgrass. The ordinary four- or five-blade mower is inefficient for cutting bentgrass.

ROUGH-STALKED MEADOW GRASS, *Poa trivialis*, and CHEWINGS FESCUE are types of turf grass commonly used in mixtures for shady places and often may be used alone in deep shade. They make a very desirable lawn and are particularly well adapted to shade and moist conditions but usually do not last so long as bluegrass. Chewings fescue is often recommended for dry shade.

Quality of Seed

A state law in Colorado requires the labeling of any package containing 5 pounds or more of the seed of lawn grass, clover, or lawn-grass mixtures; such labels are required to show the percentage of germination and the amount of noxious weed seed present.

The law does not prohibit the sale of poor seed. Much inferior seed is lawfully sold for more than it is worth. The following table shows what one should expect in quality of seed:

*Characteristics of field seeds**

Variety	Viability of good seed	Purity of good seed	Average germination one-year-old
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Bluegrass, Kentucky	70-85	75-85	30-40
Bluegrass, Canada	85	75-85	30-40
Clover, white	99	98	75
Fescue, meadow	95	90	93
Redtop	95	95-98	
Rye grass, perennial	95	98	80

Variety	Average length of vitality	Weight of seed per bushel, legal	Weight of seed per bushel, actual	Number of seeds per pound
	<i>Years</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Average</i>
Bluegrass, Kentucky	1-2	14	14-28	2,400,000
Bluegrass, Canada	1-2	14	14-24	2,400,000
Clover, white	2	60	60-63	700,000
Fescue, meadow	2		20-30	250,000
Redtop	6	14	12-40	4,135,900
Rye grass, perennial	2	—	10-30	336,000

*From Seed Trade Buyers' Guide, 1935.

Sowing

A good mixture of lawn grass for average conditions on Colorado home grounds consists of eight parts of Kentucky bluegrass, one part of redtop, and one part of white clover by weight. The seed should be thoroughly mixed and then divided into two parts: one to be sown by walking back and forth in a north-south direction; the other to be sown at right angles or in an east-west direction. At sowing time there



Figure 4.—These sods are 6-inch cubes of buffalo grass set 2 feet apart each way, 5 months before the picture was taken; note the new runner plants:

should be no soil lumps on the surface larger than a grain of wheat, and most of the soil should be as fine as sifted ashes. Seed should be covered by raking lightly or by sprinkling a thin coat of well-pulverized rotted manure, peat, or compost over the surface. Average conditions with good seed and a carefully prepared seedbed require a pound of seed to 200 square feet.

Weeds

In fighting weeds, as well as in any other battle, the best defense is a good offense. Lawns that are weedy and have thin stands of sod grasses either were not built right in the first place or have subsequently suffered from faulty maintenance methods. If conditions are

ideal for lawn grasses, weeds are a minor consideration. Proper fertilizing, watering, and mowing will do as much or more toward control of weeds than the most arduous methods of eradication.

Dandelions are probably the most widespread weed on lawns in Colorado, with plantain and crabgrass running close seconds.

In digging dandelion or plantain, do not be too ambitious and attempt to dig them all at once. If these weeds are ever in a weakened state, it is perhaps when they are in bloom. Digging only those that are in bloom accomplishes several things. It makes the task less difficult than digging thousands at one time. The task is made more definite when only certain plants are to be dug. This practice keeps the lawn tidy in appearance, because thousands of weak plants that are not in bloom will be unnoticed, blending their green with that of the turf. Digging lawn weeds can be really good sport—and a good “bending exercise” as well—if it does not last long enough to tire one unduly. When digging ceases to be sport, or when the time allotted for the work is about up, a dandelion rake should be used on the remaining plants that are in bloom.

It takes about 9 days for dandelion flowers to go to seed; but if flowers are not removed every day or two, ripe seed will be shed on the lawn for this reason: after opening each morning for a couple of days, the flower then remains closed; and its stem lies almost flat on the ground for about a week, until seed is ripe. Then it pops up with its fluffy ball of seed, and the damage is done. Flowers picked and left lying on the grass, however, will not mature seeds capable of germination.

Increasing numbers of persons are asking the Colorado Experiment Station about chemical control for lawn weeds. Just 20 years ago the station published bulletin 236, “The Dandelion in Colorado,” by B. O. Longyear, in which he stressed the need of good soil, good seed, and proper maintenance, and then gave this chemical method:

“———Spray badly infested lawns at least three times at intervals of about 2 weeks, using a solution of iron sulfate in water, 1½ pounds to the gallon. The most effective results have generally been secured in late summer. Apply the spray in the form of a fine, forcible mist which will drive the solution down into the crowns of the plants. Cloudy, damp weather is favorable if applications are not followed by rain within 12 to 24 hours. Use a spray pump with brass fittings and do not put the solution in galvanized iron, tin, or iron vessels. All utensils should be thoroughly rinsed with water after using, and the working parts of the pump kept well oiled. Wear old clothes and gloves when applying the spray and avoid getting any of it on walks, curbs, and foundations or other objects where a rusty stain would be objectionable.”

This same spray is also used on bad infestations of plantain.

For crabgrass a chemical control has been more recently developed which has been successful in the East. The Colorado Experiment Station has not tested this method and suggests it only for small-scale trial. It is merely an early spring application, either dry or in the liquid form, of lead arsenate in the same proportions as described under "Grubs."

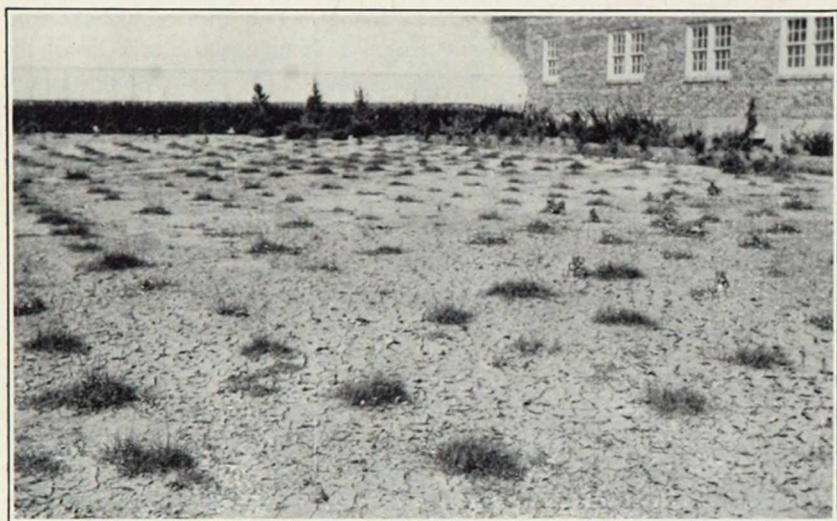


Figure 5.—Results the first summer after locating sods in the manner indicated in figure 4.

Diseases

Of several fungous diseases of grass, the most common in lawns is known as brown patch, and even this one is of little importance outside the bentgrass putting greens of golf courses. It is a disease encouraged by extreme heat and high humidity. It may be recognized early in the morning by the appearance of nearly circular spots up to a foot in diameter, each with a smoky ring around the edge.

This disease attacks the leaf blades, seldom damaging the roots. Treatment is drenching the area with mercuric chloride or calomel, prepared as described in the next topic for earthworm control. In home lawns it is often as well to let the disease run its course and the following fall rake up the soil in the patches and reseed them. This disease is encouraged by excessive night watering and excessive use of nitrogenous fertilizers.

A similar but different disease is called small brown patch or dollar spot, the latter term describing the small size of the spots

affected. This disease destroys both roots and blades, yet is not so bad a pest as large brown patch. It appears at almost any time, not just in hot-weather periods.

Earthworms

Limited numbers of earthworms are beneficial to a soil, but they sometimes increase to damaging numbers in lawn.

Corrosive sublimate is an effective control for earthworms when from 2 to 3 ounces to 50 gallons of water are used on 1,000 square feet. Liberal watering should follow the treatment.

The Entomology Section of the Colorado Experiment Station gives assurance that robins are practically the only birds that will eat worms in lawn and that, unless an unusual number of them were eaten, poisoned worms would not injure the birds. The solution itself is very poisonous and must not be taken internally.

Grubs

The grubs of May beetle or June bug, though much more important pests in the East than here, are often pests in Colorado lawns.

The remedy is 5 pounds of lead arsenate mixed into a bushel or so of sand or soil to assist in even spreading and applied in dry form to 1,000 square feet of turf or seedbed where grub injury is anticipated. When applied to turf, it should be brushed in immediately with broom, rake, or drag, and then watered.

Treatment is usually most effective in May or early June but may be applied at any time during the growing season.

Maintenance

When starting a lawn during hot months, nearly constant sprinkling is necessary to keep the surface from drying and cracking. Surface moisture retention is materially increased by a thin coat of some finely pulverized vegetable matter put on after seeding. After the sod is established, a thorough soaking every few days, as weather demands, is much better than the usual perfunctory, twice-daily sprinkling. Watering in bright sunshine is not harmful if the application is "a soaker." Subsoil as well as surface should be wet. Bluegrass roots penetrate from $1\frac{1}{2}$ to $2\frac{1}{2}$ feet and often even as much as 5 feet.

In mowing the lawn, set the mower medium high. Close-clipped grass stands less abuse than that cut $1\frac{1}{2}$ inches or higher. By mowing often enough that clippings are not unsightly, the necessity of using a grass-catcher is obviated and the cutting is done in one-half to one-third the time otherwise required. These short clippings mulch the

soil so as to check drying to a certain extent; but of course a raking occasionally is in order if accumulated clippings become unsightly, and they should be raked out in spring before growth starts.

Fertilizers

Moderate amounts of fertilizer should be applied in both spring and fall—sometimes even a little in midsummer. Manure applied to

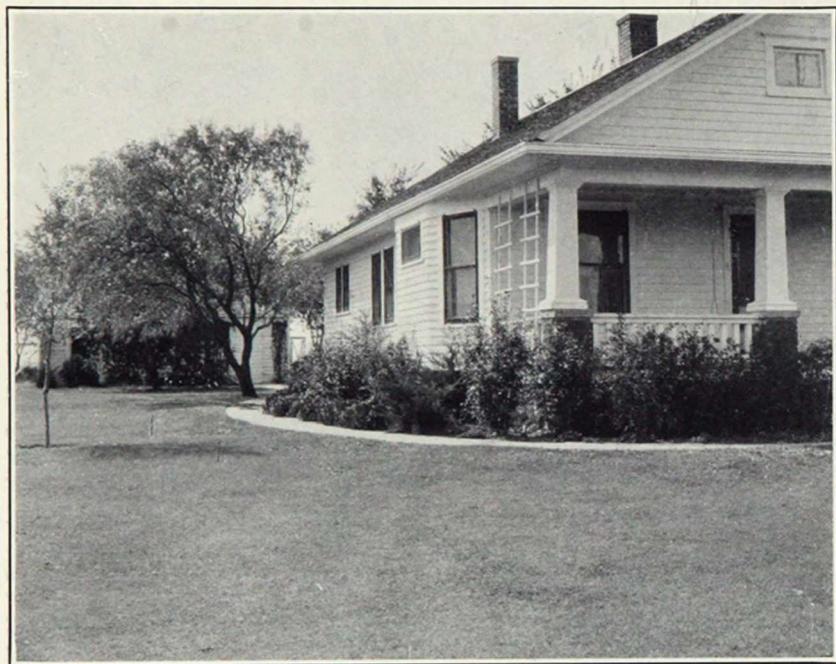


Figure 6.—This excellent turf is buffalo grass established as a lawn for a dry-land farm home.

frozen ground, or put on so thickly that the turf cannot be seen, is often wasted in the drainage runoff.

Well-rotted, weed-free manure is the best kind of fertilizer. Soil from spent mushroom beds is excellent lawn dressing. Commercial fertilizers should be in the "complete" form, preferably with about twice as much nitrogen as the total of other elements.

To be sure that manure is weed-free, some such precaution as steaming, baking, or composting must be taken to eliminate or kill weed seeds. The inconvenience or expense of these processes leads many to the use of commercial fertilizers.

At least 10 times the weight in barnyard manure is necessary to supply the amount of plant food available in "complete" commercial fertilizers. One pound of the latter to 100 square feet of turf is a good average application.

Being so much more concentrated, more care in spreading the commercial fertilizers is necessary in order to avoid "burning." There should be no lumps, and the material should be spread evenly, diluting it with sand or soil, if necessary, to assure even spreading. It should then be "watered in" to wash the material off the grass blades. If grass is wet when commercial fertilizer is applied, there may be burning unless a thorough watering follows immediately.

It is suggested in a preceding paragraph that a good commercial fertilizer for lawns should have about twice as much nitrogen as the total of other elements. Analyses that satisfy this requirement are those such as 10-6-4 and 8-5-3.

In a 10-6-4—since 10 plus 6 plus 4, or 20 percent of the total weight of the mixture, is available to plants—the mixture will cost more per pound; but less will be required than of an 8-5-3, for instance, where only 16 percent of the total weight is plant food. In other words, 80 pounds of a 10-6-4 will supply as much plant food as 100 pounds of an 8-5-3 mixture.

Analysis, therefore, must be considered in determining the actual cost of commercial fertilizers. The material with the highest price per pound may be lowest in actual cost of plant food.

Renovating Old Sod

If a sod is poor, it is best to start over; but worthy sods are remarkably improved by top dressing with a compost of two parts good soil and one part manure. If the soil in the old sod is sandy, use clayey soil in the compost or vice versa if the sod soil is clayey. Such top-dressing, one-fourth inch deep, applied in spring, mid-summer, and fall, will give the turf a "lift" each time.

Bare places in an old sod should be raked deeply, before sowing, to loosen the soil. The whole lawn then should be top-dressed and thoroughly watered.

Whenever clippings and leaves are removed from a lawn, they should be composted and later returned as a top-dressing. In this way the soil is not impoverished by the removal of its own products.

Most of the weeds found in the young lawn are not at all serious and will not persist after mowing begins. Dandelions, plantain, and undesirable grasses are the most serious persistent weeds in Colorado lawns. To date there is no miraculous and speedy method of eradicating these pests. After the initial "ounce of prevention," hand

digging and the pulling off of dandelion blooms with a dandelion rake to prevent formation of more seeds are still the most reliable "pound of cure," though it often assumes more nearly the proportions of a ton.

The presence of obnoxious weeds in the lawn, however, is no cause for discouragement, for like the poor, we have them always with us. Close inspection of lawns considered excellent will reveal a surprising

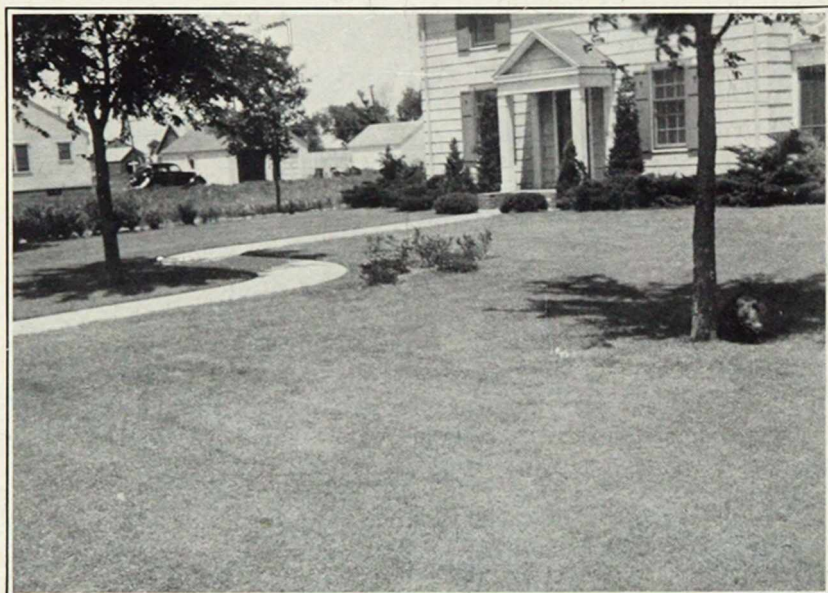


Figure 7.—This lawn is another illustration of the excellent possibilities of buffalo grass.

number of weeds. Scrupulous care in maintenance is the secret of fine appearance; if given this care, your lawn will make a very creditable carpet for your outdoor living-rooms, despite the presence of a few weeds which you intend digging on the elusive day "when there's nothing else to do."

Acknowledgments

The photograph for the cover illustration and the engravings for figures 1, 2, and 3 are by courtesy of the Extension Service of Colorado State College. The photograph for figure 4 was provided by the Range and Pasture Management Section of the Colorado Experiment Station. Photographs for figures 5, 6, and 7 were provided by the Division of Forage Crops and Diseases, Bureau of Plant Industry, United States Department of Agriculture.