HOW TO IMPROVE POSTWAR TURF MAINTENANCE

By O. J. NOER

This is the last of three articles dealing with postwar turf maintenance. One on greens appeared in October, 1945, issue and another on tees in January, 1946, issue of Golfdom.

FAIRWAYS have become the chief concern of golf clubs everywhere. Even before the war their improvement was a live topic. There has been further deterioration of turf since Pearl Harbor and the weed and clover population has increased because of inevitable wartime neglect.

Responsible club officials and greenkeepers are groping for a quick and sure method of improvement. The acreage requiring treatments such as seeding, liming or fertilization is large, so the outlay of money may be considerable. Any plan of procedure should be scrutinized from every angle. It is important to do the job well, and have each step follow in an orderly sequence. Otherwise failure may result.

The fairways on an 18 hole golf course represent an area of 40 to 60 acres. For practical purposes, there is an acre for each 100 yards of fairway length when the average width is 50 yards. The area in front of tees, up to 100 or 150 yards is generally considered as rough and treated as such; the short holes may or may not have an approach of well-kept turf.

There is an easy and quick way to compute the fairway acreage for determining the amount of seed, lime, or fertilizer needed. Simply take the total yardage of the course and deduct the yardage of the roughs in front of the tees, and the yardage of the short holes. This figure, divided by 100 for fairways of 50 yards average width, or by 80 for fairways which are 60 yards wide, is a very close approximation of the area to be treated.

Agitation for fairway watering is general and many irrigation systems will be installed. Golfers think it is the sole answer to good fairways. They clamor for water to make walking less arduous, and because they like to see green fairways all season. Watering actually complicates rather than simplifies fairway maintenance, especially in the bad crabgrass region from Philadelphia and Washington across to Cincinnati, Louisville, St. Louis, and Kansas City. Heavy watering and close cutting without adequate fertilization has ruined the turf on many fairways. The blue grass and fescue disappear and their place is taken by poa annua, knotweed, chickweed, and clover. Turf is good in spring and fall when poa annua is at its best, but when it disappears in early summer, clover and knotweed, or crab grass, become so bad that golfers complain bitterly.

Fairway watering will not become general and accepted practice until the relationship between water usage and feeding is clearly understood by club officials and playing members. It is best to forget about watering unless the club is prepared and able to carry the extra financial burden of more generous fertilization and extra mowing, in addition to the cost of water and its application.

Make Grass Survey

A careful survey should be made before watering starts to see that fairways contain suitable grasses. If fescue predominates, it is sure to disappear within a year or two. Then poa annua, clover and weeds will overrun the fairways even though fertilization is adequate. Such fairways should be reseeded to introduce better grasses before watering starts. A combination of Kentucky blue grass and colonial bent seems best, although some advocate using bent seed only. When the mixture is used it seldom need contain more than 5 to 15 percent of bent grass seed.

The trend seems to be towards more bent grass in watered fairways. The use of bent grass is natural and logical, because it increases of its own accord on watered courses, and can not be eliminated or kept out of the turf. The colonial types are preferred, yet creeping bents seem to come, but nobody knows how. A mixed turf of blue grass and bent would seem ideal, but it is hard to grow them together. Close cutting is imperative when the amount of creeping bent is large. Then blue grass suffers and is apt to fare badly

from leaf spot in cool wet seasons. Chinch bugs have been the biggest drawback to the use of bent grasses. Sabadilla and DDT dusts promise to solve this menace.

Sidehill Slopes A Grass Problem

The sidehill slopes on some of the hilly watered courses in St. Louis and elsewhere seem to resist all attempts to establish playable turf. The surface soil is a light colored silt loam, and the subsoil is a silty clay in texture. The plant population is largely clover, knotweed, crab grass in the summer, and poa annua in the cooler parts of the growing season. Reseeding does not seem to help. The new grass germinates and makes a good start in the fall, but is gone by the next summer. The trouble may be due to damage caused by excessive seepage in the early spring. Should this assumption be correct, tile drainage would solve the problem. The lines of tile should run crosswise of the slope and the trenches should be backfilled with gravel, or other coarse material to trap the water and conduct it down to the tile. The best thing to do is to make a test on one hillside and install enough lines to eliminate seepage in the spring and do the other fairways after the initial experimental installation proves its worth. Aside from any effect on turf, the tile will permit earlier play in the spring by two to three weeks. Growth of turf in the spring will start earlier because surplus water keeps the soil cold.

Weed Control Incomplete Answer

Clubs must realize that weed control with chemicals is only a part of the problem. Those who do nothing else than use chemical herbicides will end with more weeds than before. The ultimate aim and the important thing is to grow grass. This can and has been done by fertilization alone. The weed control chemicals speed the process. They kill the weeds so the fertilizer is not wasted on them, but expends all its energy on the turf grasses.

Chemical weed control is going to have a big play. The enthusiasm is keener now than ever before, due principally to the new hormone 2,4-D. Some of the results obtained with it have been spectacular. The kill of dandelion, plantain, and buckhorn has been especially good. It has no effect on crabgrass or poa annua, and one application checks but does not eliminate clover and chickweed. There have been several cases of bad damage to bent grasses, especially the creeping type. Extensive use on fairways containing a large proportion of bent grass, or on greens, should await additional information based on further trials. But the spot treatment of broadleaved weeds in localized areas of bent grass on fairways or in neglected greens with a small power sprayer is entirely feasible. 2,4-D is another useful tool, but is not likely to eliminate the arsenicals completely. They will kill crabgrass and the existing crop of poa annua, as well as clover, plantain, buckhorn, etc. The arsenicals have a distinct place in the renovation of overwatered and underfertilized fairways which consist of clover, poa annua and knotweed. Besides their effect on weeds, the arsenicals help control worm casts and white grubs.

On fairways where broadleaved weeds predominate, and there is some permanent grass which is more or less uniformly distributed, a treatment with 2,4-D followed by adequate fertilization will produce good turf quickly. Programs can begin during spring in the sections where crabgrass is not bad. Liberal fertilization should precede or accompany the 2,4-D treatments to encourage the grass to spread and form turf. Farther south, where crabgrass is a serious menace, it would seem best to use the herbicide in late summer or early fall and fertilize liberally in addition.

On fairways where there is much clover and poa annua with little or no permanent grass, several treatments with sodium arsenite, or arsenic acid, accompanied by fertilization, and followed by reseeding, is the more logical procedure. The arsenical treatments should start during the summer so reseeding can be done in late summer or early fall. From three to four treatments spaced two to three weeks apart, are needed. The fairways can be reseeded immediately before the last arsenical treatment because neither sodium arsenite or arsenic acid prevent the germination of grass seed. A good seed bed can be prepared with a fairway disc spiker, and a Thompson or Cyclone seeder can be used for seeding. A light rolling after seeding is advisable to press the seed into the soil.

When using any chemical herbicide on weeds, uniform coverage is the important thing. That applies to the dry as well as the wet method. Not over 100 gallons of water is needed for spraying and good kill has been obtained with half that quantity even with 2,4-D.

Weedy roughs are a constant menace and the main source of broad leaf weed infestation of fairways. The elimination of weeds in the rough should accompany or precede the treatment of fairways.

Watch Soil Acidity

It is now conceded by everybody that soils can become too acid even for acid tolerant grasses, such as bent and fescue. Soils which are moderate to strongly acid definitely need lime, irrespective of the grass species. With borderline soils, no harm will result from delay until the actual need is established by test strips

(*Continued on Page* 59)

Improve Postwar Turf

(*Continued from Page* 28)

across one or more fairways, particularly if bent or fescue predominate.

There are several inexpensive sets suitable for determining soil reaction quickly. The tests can be made on the ground by the greenkeeper, or samples can be collected and sent to the State Agricultural Experiment Station, or other reliable testing agencies.

Soils needing lime should be checked for available magnesium, especially on courses located along the Atlantic Seaboard. Many of the soils there are so low in magnesium that the superior results often obtained from dolomite limestone may be due to a direct effect of magnesium as a plant nutrient. When a dolomite is used, it should contain at least 20 to 30 percent of magnesium reported as magnesium oxide.

Some firms in the eastern part of the United States sell a mixture consisting of equal parts ground limestone and hydrated lime, and call it agricultural lime. It is a good material, somewhat higher in price than ground limestone because of the expense for making hydrate and the cost of mixing. The precautions that apply to hydrated lime apply to agricultural lime. An interval of several weeks should elapse between an application of it and a mixed chemical fertilizer, otherwise some of the ammonia in the fertilizer will be released as gaseous ammonia. Besides scorching the grass severely, it escapes into the air.

Besides the test for soil reaction, chemical tests for phosphorus, potash, magnesium, etc. are helpful. Existing methods are not satisfactory for nitrogen. Need for it can be judged by the condition of the turf, as well as the amount of clover and weeds. Samples from grassland areas should be taken to an exact depth of 2 inches. Chemical tests are meaningless unless the soil samples are collected correctly, and a dependable method of testing is used.

Nitrogen and phosphate are the two elements most needed by established turf. Potash is of lesser importance because clippings are not removed and because most soils contain large amounts of it. The poorer sands and the organic soils are the ones which may require potash in quantity.

The generous use of nitrogen is the key to denser turf on established fairways. Heavy rates are justified until turf of desired density is obtained. After that the rate can be reduced to the bare maintenance requirement. In crabgrass regions, major nitrogen fertilization should be in the fall with smaller doses in the spring so as not to encourage crabgrass. Farther

TESTED AND RECOMMENDED
FERTILIZER DISTRIBUTOR

POSITIVE, UNIFORM DISTRIBUTION
PREVENTS "GRASS BURNS"
EASY TO CLEAN . . PATENTED
ACCURATE RATE CONTROL

E. S. GANDRUD COMPANY
BOX 447G
OWATONNA, MINNESOTA
Originators and Manufacturers

When it is
GOLF PRINTING!

Specialists, for years to many of America's largest and most exclusive courses, can *best serve you, too.*

Score Cards - - Charge Checks
Greens Maintenance Systems
Caddie Cards - - Handicap Systems
Forms for Locker and Dining Rooms and for the Professional.

Samples to your club for the asking.

VESTAL CO., 703 S. La Salle, Chicago

R. H. Tractor Wheel SPUDS

quickest to put on or take off. Increase tractor efficiency and cultivate turf . . . that's why more than half the U.S. and Canadian clubs use them. Durable and low priced.

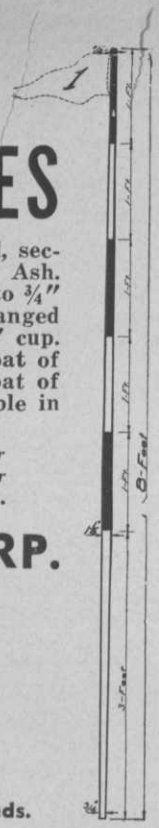
Sample spud and circular on request; advise make of tractor and purpose for which intended.

Immediate shipment. If your Ford or equipment dealer cannot supply, write direct to

R. S. HORNER
Geneva, Ohio

MFR. OF SPUDS, FORDSON WHEELS, ETC.

HARDWOOD FLAG POLES



Made of the finest, seasoned, second growth, tough White Ash. Tapered from 1" at bottom to ¾" at top, and fitted with flanged ferrules to fit standard 1⅛" cup. Sanded finish with prime coat of lead and oil and finished coat of finest white enamel. Available in 2 or 3 color combination.

Your inquiry or order will be referred to our Distributor, nearest you.

LEAVITT CORP.

(Est. 1895)

URBANA, ILLINOIS

Builders of

KNOCKDOWN

bleachers

for sports events of all kinds.

north, heavy spring feeding is feasible and desirable in addition to the fall application.

The need for phosphate has been overemphasized by some. It should be used liberally on soils known to be deficient, or where reseeding is necessary. After one generous application, additional phosphate in quantity is not needed for three or four years at least. Ordinarily a fertilizer containing about half as much acid as nitrogen will suffice.

In this connection, the importance of using superphosphate, or a fertilizer high in phosphoric acid, before seeding, should be stressed. This applies to new grasslands as well as the reseeding of established turf.

There is much confusion about mowing, especially with respect to height of cut. Fairways are never cut close enough to suit exacting players. Grass cut at ½ inch would suit them fine. Complete surrender to any such demand is suicidal except on bent grass fairways. Turf deterioration, together with weed and clover infestation inevitably follow continuous close-cutting, particularly when Kentucky blue grass or fescue predominate.

Turf must be cut high enough to allow grass to manufacture needed carbohydrates (principally sugar, starch, and cellulose). This is the principal function of green leaves. The process is called photosynthesis, because it occurs only in daytime. The energy needed to cause carbon dioxide and water to unite comes from sunlight. But the two combine only in the presence of chlorophyll, which is the green substance in the leaf. The sugar is converted into starch, cellulose, fat, etc., or is elaborated into protein, chlorophyll and other complex substances by combining with nitrogen, phosphorous, sulfur, magnesium, iron, etc. So when considering or discussing the fertilizer requirements of turf, it is important to remember that the grass itself builds the primary raw product from which every other constituent is derived. Any fertilizer is effective only when the turf has enough leaf surface to produce needed carbohydrate.

The fact that about 95 percent of the dry weight of grass is carbohydrate, or its derivatives further exemplifies the importance of sugar manufacture in the leaf. Only 5 percent comes from the soil, or applied fertilizer.

From a practical standpoint, inherent differences in the growth habit of grasses should be taken into account in deciding upon height of cut. Kentucky blue grass, Canada blue grass, and the fescues creep by means of submerged stems. Their leaves grow erect. The bents and poa trivialis spread by means of surface runners. Their leaves tend to grow horizontally. Consequently, these grasses can be cut closer with impunity than the blue grasses or fescues. Too high cutting of creeping bent is actually detrimental. It favors development of an objectionable thick surface mat. During dry spells this mat impedes the penetration of applied water, and by trapping surplus water it causes the turf to rot during hot wet spells.

It is best not to cut Kentucky blue grass and fescue closer than 1 to 1½ inches. The preferred practice is to approach the higher limit and not to cut continuously below an inch. Then the turf will become thin and will be invaded by clover, poa annua, crabgrass, and other weeds.

During spring and fall, when weather is cool and grass grows rapidly, no harm will result from somewhat closer cutting. But with the approach of summer, mowers should be raised and grass cut higher. The extra growth insulates and shades the

M. J. SULKA

GOLF COURSES OF DISTINCTION
DESIGNED AND CONSTRUCTED

41 LEONARD AVENUE

ATLANTIC HIGHLANDS, N. J.

JACK L. DARAY
Golf Architect
Designing and building fine golf courses for more than 25 years Consultant on postwar remodeling.
Cherry Hills Golf Club, Flossmoor, Ill.
Phone Homewood 781

SEEDS - SUPPLIES - EQUIPMENT
for
The Most Exacting Golf Courses
McMAHAN'S SEED STORE
LaPorte Indiana

ground, thereby reducing the loss of moisture from direct evaporation. Consequently the turf stays green longer and survives drought better. Shade also helps discourage clover and crabgrass.

Mowers can be raised at any time, but should never be lowered drastically in hot weather. The only safe way is to lower the cut slowly, just a little each week.

Fairway watering has brought several vexing problems. Mowing is one of them. Present mowing equipment was designed before fairway watering started. The grass on watered fairways is softer and grows faster than on unwatered ones. Higher cutting of watered fairways would be possible if the grass could be cut before wheels of any sort passed over them. Under existing conditions, higher cut fairways are ragged and unsatisfactory for play a few hours after being cut because of the longer grass in the lines left by the tractor and mower wheels.

Controlling Chinch Bugs

(*Continued from Page* 40)

applied with power dusting equipment gave better than 90 per cent reduction in chinch bug population.

Tests conducted in 1945 with DDT and Sabadilla dusts of less than 10 per cent concentration failed to give satisfactory control of chinch bugs and the DDT dusts failed to exhibit any marked residual toxicity. DDT applied as spray and mixed with top dressing and sand also gave excellent control of chinch bugs when 10 pounds or more of technical DDT was applied per acre.

The conditions for applying DDT sprays are not so exacting and we have obtained satisfactory control even when sprays were applied in a light rain. Where dust applications are made with hand equipment we found that from 150 to 200 pounds of dust per acre was required to obtain thorough coverage. Dust applications should be made when the grass is dry and the grass should be cut as short as possible so that the dust can be forced to the base of the grasses where the chinch bugs are feeding. Both of these materials are contact poisons so the dust must contact the insects to be effective. Thorough coverage is necessary with both materials.

DDT is a slow acting poison and a period of at least 5 days should be allowed before judging the effectiveness of DDT treatments. DDT treatments have exhibited a residual toxic action to chinch bugs for a period of 10 to 14 days in tests conducted in 1945. This period was of sufficient duration to kill any nymphs that might hatch from eggs deposited by adults that were present when the treatment was applied, consequently one DDT treatment controlled the chinch bugs for the season in our 1945 tests.

Sabadilla is a much faster acting poison than DDT but a period of 48 hours should be allowed before judging the effectiveness of a treatment. Sabadilla did not exhibit any prolonged residual toxic action in our tests in 1945. Sabadilla is apparently highly irritating to chinch bugs and they become very active following dust applications, this activity is apparently accelerated by high temperatures. During the past season, 10 per cent Sabadilla at the rate of 100 pounds per acre was generally recommended in New Jersey. Reports reaching the Experiment Station indicate that the home owner found that this treatment gave satisfactory control of chinch bugs during 1945.

CLASSIFIED ADS

Other Classified Ads on Page 65

ATTENTION CLUB OFFICIALS: Are you looking for a qualified greenkeeping superintendent? Our association has on file men who can qualify for that position. Some are returning veterans who desire to again enter this field. Address: The Greenkeeping Supts. Assn., Secretary's Office, St. Charles, Ill.

Pro-Manager: Veteran recently discharged from Army after three years service desires permanent affiliation with progressive club. Active resort, industrial, or business employees club favorably considered. Fully experienced in the golf business: teaching, administration, merchandising, sales, promotion. A-1 references and credit rating. Wife available as club secretary. *Address: Ad* 205, *% Golfdom.*

Veteran, 29, married, desires professional job coming season. Available March 1. Will go anywhere. *Address: Ad* 206, *% Golfdom.*

Expert Club Maker just out of army, desires position as assistant pro or caddy master in private club near Chicago or Aurora, Ill. Age 29, good personality, married. *Address: Ad* 207, *% Golfdom.*

Expert club repair service. Clubs refinished, rebuilt. Quick service on all types of repair work. Write for price list. E. L. Wilson, Twin Oaks, Route 1, Box 31, Batavia, Illinois.

Pro—Pro-Greenkeeper—Asst. Pro. Ex-serviceman, 27 years old. Excellent instructor and player. Will go anywhere. Box 563, Cheraw, S. C.

Having completed 3 years of essential war work, would like to contact club needing services of Pro-Manager or Pro-Greenkeeper. Can furnish references. *Address: Ad* 208, *% Golfdom.*