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TROY, OHIO



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QUESTION 11.

- a-How many men are needed (approximately) for an 18-hole golf course?
- 10 men are needed for an 18-hole golf course.
- b-Show approximately how the jobs on the course would be divided amongst these men.
- The labor would be divided among these men as follows:
 - 1 man-mow fairways and roughs.
 - 2 men-mow greens, tees, approaches, spike-roll greens.
 - 1 man-move cups, tee markers, put out clean towels, etc.
 - 1 man-do trucking (for both golf course and other departments).
 - 1 man-take care of clubhouse grounds, cut flower beds.
 - 1 man-mow with scythe, ditches, etc.
 - 1 man-do repair work, carpenter work, etc.
 - 2 men-available for work not routine such as topdressing, weeding, etc.
- The above work is routine, and none of it occupies the full time of any of the men. With the last two men in the list as a nucleus, a gang of four or five men or more can generally be made up any day (especially in the afternoon) to do the jobs that are more efficiently done by a gang.

QUESTION 12.

- If called to a strange course to diagnose trouble they were having with their turf, tell how you would determine what the trouble might be.
- In trying to diagnose a turf trouble on a strange course I would:
 - 1. Get a past history of fertilizer treatments, chemical treatments, mowing practices, etc.
 - Present history-of when trouble started, how it appeared at start, length of time developing, etc.
 - 3. Examine the turf for disease, burns, mowing scars, etc.

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- Examine other strains of grass to see if more than one strain were affected.
- Examine and test soil for drainage, puddling, excess acidity, alkalinity, etc., in both good and bad areas.
- 6. By a process of eliminating all of the above factors that seemed to be all right, try to narrow them down to one or more that were not good and thus probably would be what was causing the trouble.

QUESTION 13.

a—List six trees suitable for planting on a golf course and tell the kind of soil they prefer.

White pine—Sandy loam, fairly dry. American elm—Sandy loam, fairly wet. European larch—Clay loam, very wet. Norway maple—Sandy loam, moist. Silver maple—Clay loam, fairly wet. White oak—Clay loam, fairly wet.

QUESTION 14.

- a—Should a greenkeeper keep cost accounts? Why?
- Yes. Because they enable him to tell his club officials at any time where the money has been spent, what they have received for their money, whether old equipment should or should not be discarded for new, and what any particular job or section of the course costs to maintain. They also help him to estimate the cost of new items, such as new traps, etc., and to make up a reasonably accurate budget for the new year.
- b—Should a greenkeeper make written reports to his chairman? Why?
- Yes. Because they give the chairman, who probably is busy with his own job, a quick, easy and accurate answer to questions concerning the course. They also give the greenkeeper a record of things which happened in the past.

QUESTION 15.

- a—What are the duties of a greenkeeper? The duties of a greenkeeper are to directly oversee and be responsible to the green-committee chairman for the upkeep and maintenance of a golf course and any other departments, such as tennis courts, etc., as may be assigned to him.
- In this respect he makes up the budget for the chairman's approval, hires, fires and directs laborers, makes up and carries out all fertilizer, mowing, watering and topdressing programs, etc.
- He should make reports to the chairman at intervals on the condition of the course, things needed for the upkeep, work planned for the future, money left in the budget, and when some unusual problem arises, which he does not feel competent to handle alone, should ask him to hire outside experts for advice. —Furnished courtesy **The Greenkeepers**' **Reporter.**





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GOLFDOM

MAY, 1940



Why Corrugated Turf?

By John Monteith, Jr.

Some of the possible causes of the "washboard" effect common on many courses' fairway turf, are discussed by the author, who also suggests remedies

FOR several years there has been an increasing number of complaints about corrugations in fairway turf. This condition takes the form of a series of wavelike ridges that usually may be somewhere between 8 and 12 inches apart. The distance between the crests of the ridges may vary on the same course and they likewise vary decidedly in depth. In some instances the corrugation is of such a minor extent that it is scarcely discernible. In other cases the corrugation may be so pronounced that balls settle in the depressions and provide a distinctly unfavorable lie.

In the minor cases of corrugations the effect appears to be chiefly on the grass itself; that is, the grass seems to be cut closer in the trough of these waves and cut longer at the crest of the waves. In the more severe cases there is a ridging of the soil itself and it is in such cases that the playing conditions of the turf are most severely affected. In many instances of the more advanced stage of this corrugated condition the composition of the turf is materially changed. One often finds that the troughs are covered chiefly with white clover whereas the crests of the waves are composed mainly of grass.

The corrugated condition may occur on isolated areas on the course or in some instances it has been found to a greater or lesser extent on practically all of the fairways on the course.

Various theories have been advanced to explain these corrugations. Unfortunately no tests have been made to determine their exact cause. The purpose of this article therefore is merely to call attention to them and to discuss some of the possible causes and apparent remedies.

The general similarity of this corrugation to the "washboard" effect so common on roadways with gravel or crushed rock surfaces immediately suggests the association of this condition with the rhythmic vibrations set up by machines going at a rapid pace over the surface. Naturally one immediately traces it to the various machines drawn over the fairways.

Fertilizer Application Not at Fault

It has been suggested that the corrugations may be traced to fertilizer being dropped on the turf unevenly due to certain jarring action as the distributor is drawn over the turf. Such jarring, it has been argued, would tend to drop the fertilizer in ridges crosswise on the fairway and result in a more rapid growth across the strips where most fertilizer had been jarred down. This theory immediately appears to be untenable on several counts but chiefly because it has been observed on fairways that have not been fertilized in many years.

Another explanation is that it is probably due to rolling the course when the soil is too wet. It is pointed out that when the rollers hit a high area they may jump a bit and then as they come down they will tend to make a depression in the soft soil; then will tend to jump. out of that and so start a rhythmic jumping effect which will result in irregularities in the soil. This cause seems possible but not probable in most instances since the rhythmic vibration of this nature in a roller is not apt to continue as far as it is observed to occur on many fairways. Also, such an explanation would not account for the minor irregularities that appear to affect only the grass. Since these minor irregularities appear to have approximately the same spacing as the deeper corrugations that definitely affect the soil, it is logical to assume that they originate in the same way and can hardly be traced to any rolling that may have been done several months earlier.

The explanation that appears to be most generally accepted as the logical one is that the corrugations are in some way caused by the mowing units. It has been observed that they always occur perpendicular to the direction of the usual mowing operations.

High Speed Mowing Possible Cause

The development of these corrugations in recent years suggests some connection with the high speed of the modern mowing operations. We all realize that the washboard road was not a phenomena of the horse-and-buggy days but is something we always associate with the high speed days.

In an advanced stage of fairway corrugation the soil is also ridged and the botanical composition of the turf is different in ridge and furrow. Playing conditions are definitely affected. Various possible explanations have been suggested for this irregular cutting, such as slippage or too tight a setting of one or more of the units. This may be respon-



This photo shows a perfect example of fairway turf that has developed the "washboard" effect, caused, probably, from one of the reasons set forth in this article.

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sible for the effect in some instances. However it appears to be likely to be caused by any number of disturbances which would affect the smooth operation of the mowers.

As the mower units are drawn rapidly over the turf it is conceivable that any irregularity in the surface may cause the roller of the unit to snap up and then come down sharply, rebounding several times before regaining equilibrium. Such a condition has been recorded in tests by the Bureau of Public Roads when automobiles have gone over obstructions placed on a smooth highway. A line on a chart rating the vibrations caused in such highway tests takes the form of a series of waves of decreasing depth until they flatten out on the smooth road. Such an effect was naturally more pronounced with solid tires than with pneumatic tires, which are able to absorb much of the shock.

Rhythmic Motion Set Up

In the case of the mower unit the roller, like the solid tire, is unable to absorb the shock and a definite rhythmic up-and-down vibration may be set up. On the down stroke the bedknife is slapped down well into the turf and the knives cut close. On the upward swing the bedknife is lifted so the grass remains longer. The original impetus may come from a ridge where moles have been working or from some minor obstruction such as a small stick or a divot. It may even be provided by a piece of dense tufted turf. The first series of undulations are probably not very numerous, but with each mowing they are carried on further along the fairway and finally over the entire length of the fairway the mowers may continue this rhythmic vibration. When the ground is hard these vibrations affect only the turf plants. When, however, the ground is very wet, particularly in the case of clay soils, the blow delivered by the roller on the down stroke may be heavy enough to make a definite depression in the ground. With each subsequent mowing when the ground is wet, this depression may be increased in depth. Naturally the deeper the depression the heavier the blow delivered by the roller. Therefore once this corrugated condition develops in fairways it is likely to become increasingly pronounced unless immediate steps are taken to remedy it.

Corrugations appear likely to develop on fairways regardless of the type or manufacture of mowers used. Units equipped with either the large or the small type of rollers have produced this condition. Corrugations have been observed on courses where the mowers are drawn with rubber-tired tractors and also on courses where metal wheels are used.

The best remedy for corrugations appears to be to cross-roll-and-mow the affected fairways. It appears to be necessary to cross-mow only occasionally to keep these irregularities in check after they have once been definitely overcome. Where it is inconvenient to mow across the fairway it is possible to check the damage by diagonal mowing occasionally. In the more advanced stages where the soil itself has been corrugated, crossmowing may not be sufficient. In such cases rolling in early spring or at other seasons when the soil is soft appears to satisfactorily solve the problem, espe-cially if it is combined with cross or diagonal mowing at frequent intervals during the season.

Since the problem of fairway corrugations is one of those problems where "an ounce of prevention is better than a pound of cure" it is well to be constantly on the lookout for its early stages. Wherever such a condition appears to be developing it is advisable to change the direction of the mowing at once. Perhaps two or three mowings in the opposite direction will be sufficient to prevent any objectionable corrugations. Where it appears to be developing only in a limited area it may possibly be corrected merely by change, for a time, in mowing speed.

Colorado Officials Contemplate Course for Greenkeepers

STATE of Colorado, division of agriculture, is considering the possibility of having a greenkeepers' short course for men in the Rocky Mountain region.

Wide variation in maintenance problems and distances short course students must travel from limits to the center of the Rocky Mountain area, are handicaps. However, outstanding achievements in this section's course maintenance and increasing importance of golf for resident and vacation recreation leads the state's agriculture authorities to believe the proposed short course would have enthusiastic reception and be of substantial value.

WPA Big Factor in Golf Growth

500 courses affected by WPA work of constructing and improving 40,000 acres of golf links

THOUSANDS of Americans who until a few years ago couldn't tell a putter from a niblick today are playing over more than 40,000 acres of golf links, constructed or improved by the Works Projects Administration since its inception in the summer of 1935. An inventory just made public of WPA's physical accomplishments from the start of the program through December 31, 1939, shows that in that four and one-half year period 500 modern, sporty public courses, with a total of more than 6,000 holes had been made available to golfers in nearly every state by the Federal work relief program.

More than 200 of these courses, aggregating 2,300 holes and occupying 15,000 acres, are brand new, scientifically designed to meet the particular needs and finances of individual communities. Nearly 300, with more than 3,700 holes and covering some 28,000 acres have been improved through re-sodding, new fairways and hazards, landscaping, drainage and other alterations.

As a result golf, as a popular recreation, thrived through depression years, with more and better courses in the country today than there were in 1929. And it has been common experience that the number of golfers increases as new courses are put at their disposal.

Work Done Only for Public Courses

All this work of the WPA is, of course, in all cases on publicly owned and operated links, usually under the sponsorship of a municipality but in some instances under the sponsorship of counties. Aside from the recreational value of this wide program of golf course development, important as it is, work of this particular type has been of tremendous material benefit. To begin with, construction and improvement of golf courses is ideally adapted to the primary objective of the Federal work relief program-to provide work on worthwhile projects of permanent value for employable persons on local relief rolls.

The municipal governments benefit through the increase in real estate values through the reclamation of wasteland on which many of the courses are built, and through residential developments which spring up in their vicinity.

For example, the Washoe County golf course at Reno, Nevada, has brought about a noticeable increase in residential construction. City Park golf course in New Orleans, where the third Crescent City \$10,000 open tournament was played in February, was an impenetrable swamp only a few years ago. The Work Projects Administration and the city of New Orleans have transformed this swamp into one of the finest golf courses in the South. The 1940 tournament was one of the most successful ever held in this city and attracted thousands to the new range to see Jimmie Demaret of Houston carry off the purse with a total of 286 for the four rounds.

New Orleans Gets New Clubhouse

Spectators at the tournament had the opportunity to inspect City Park's new golf clubhouse being constructed by the WPA and now nearing completion. Using the old clubhouse as one wing of the structure WPA workmen are completing a central building, two stories high, flanked on the left by a wing which will be used as a men's locker-room, increasing lockerroom facilities from 75 to 250 lockers. The building will also house facilities for women golfers.

In the construction of other new courses, many difficulties were encountered and overcome. Boston's George W. Wright golf course in the Roslindale-Hyde Park section was literally carved from rockribbed New England countryside. To construct the course, which has been acclaimed by Boston linksmen as equal to any private club in the Metropolitan area, masses of underbrush, boulders and woodland debris had to be cleared away, ledges and rock outcroppings blasted and covered with loam; swampy valleys drained and graded.

Ithaca, New York, for years had wished to develop its lake front, a tract of some 300 acres, one-third of it little more than a swamp, on Cayuga Lake. On this site, which for 20 years had been used as a

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public dumping ground, a 9-hole golf course was constructed after 30 acres of scrub willows had been cleared and grubbed, 35 acres of dump area graded and the swamp land filled with material from the graded acreage.

Baker, Oregon, until recently struggled with a municipal golf course situated on an alkali bed which could not be drained satisfactorily, and upon which grass could not be grown. A tract of 55 acres near the city reservoir was provided by the city and with the aid of the WPA a 9-hole course was constructed, the only turfed course in the county.

At West Seattle, Washington, work is nearing completion on an extension to the existing golf course as part of a large recreation area being developed from a 208-acre former cut-over tract and garbage dump. The course will be ready for use this spring.

Completion of two new public courses

late in 1939 and improvement of three others has provided additional facilities for Philadelphia's public linksmen.

One of the first of the courses to be rehabilitated by the WPA was the Pelham Bay links in Greater New York. That course, which originally measured less than 6,000 yards, with the greens the only places closely mowed, was completely rebuilt. It now measures 6,600 yards, has been landscaped throughout with trees and shrubs, has fine draining and irrigation systems, and, as is generally the case in WPA-built courses, has an attractive clubhouse. During the first year of its use, 1937, a total of 48,000 rounds of golf were played over its fairways. In the construction and improvement of these hundreds of public courses, the WPA has sought the expert advice of recreation and, particularly, golfing authorities experts.

`Panhandle'Gets Grass Greens Course

By George May

THE City of Amarillo (Texas) set out to build an 18-hole grass green golf course with \$40,000, and almost did it. On March 1, when the course was put on a maintenance basis, the costs were tabulated at \$41,929.28.

The work included a complete high pressure watering system for the fairways, greens, and tees, a new clubhouse, 1,600 trees, 18 big greens and the work done on the fairways and tees. Cost of the clubhouse alone was \$17,500.

Amarillo's city commission, headed by a golfing mayor, Ross D. Rogers, has accomplished something remarkable, but they don't believe they have done anything other golf-conscious cities can't do. Amarillo had one big advantage in that it had a 640-acre park almost wholly undeveloped. Mayor Rogers, after careful study of the entire park area, selected 225 acres of high rolling ground as the location of the links. The course is laid out along four low hills. When construction started the land was fairly well covered with native grasses.

From the city street department the course borrowed a large piece of road



Amarillo's new clubhouse for muny course golfers, which has just been completed, provides ample shower and locker facilities, plus plenty of lounging space; cost was \$17,500.

For the first time in the 35 years of the NY Metropolitan GA Open championship, the final has been scheduled for Sunday. Dates: May 24-26; at Forest Hill Field club, Bloomfield, N. J. It's an effort to restore NY sectional championships as gallery attractions.

machinery, and from the water department it got a ditching machine. The grader, doing the work of about 10 teams, built the greens and tees, each with from 5,000 to 7,000 sq. ft. of surface, within a few days.

Experienced crews dug the ditches and laid the pipe to the tees, greens, and along the fairways at remarkably low costs. Nevertheless the use of machinery, labor, and materials all were charged against the course. The only chiseling on other departments was in the matter of trees. From the parks' nursery the course got 1,600 4-year-old trees without cost, but the city commission believed this was justified since the course has been made part of the parks system. To plant the trees, the city sponsored a WPA project, which represents the only relief work done on the course. All other work was done without government help.

The greens were seeded last summer with cocoos bent grass. W. A. McConnell, veteran Texas and Kansas professional, reports a fine stand of grass in spite of the rather severe winter. The fairways have been cultivated in preparation for the Bermuda grass seeding. However, care was taken not to destroy the native grasses, which will protect the Bermuda until it gets a good stand.

The result of the \$41,929.28 expenditure is a truly fine course—declare golfers who have been on the ground. It is 6,426 yards long, par 71. It will be remembered that this part of Texas not many years ago was dubbed a "dust bowl," and there were certain individuals who suggested its depopulation. Nothing of the sort has happened, of course. Amarillo in the last five years has gained more than 10% in population, and the trade territory surrounding it has done at least as well.

Mayor Rogers and the other commission members have dedicated the course to the people of the entire Panhandle area. They announced 50 cent week-day green fees, with a 75 cent charge for Saturdays, Sundays, and holidays.

There are some new ideas embodied in the course construction. One instance of this is that trees serve as windbreaks, as well as to outline the fairways, greens, and tees. Another example is that the course has no sand traps. The builders reasoned that since the winds whip sand out of the traps as fast as it can be carted in, they would get along without them. Sandless traps, they said, are unfair hazards. Instead, the course has grassy hollows, grassed embankments, and tree hazards.

This is all in the area long believed golf's great American desert. Nevertheless the Amarillo municipal course isn't the pioneer grass course in this section. Amarillo Country Club's grass course, also built by Mr. McConnell, is 12 years old. The city can claim, though, the only public 18-hole grass course in the Texas Panhandle, the only one between Wichita Falls, Texas, and Denver, Colo. It pioneers an entirely new field for grass green golf for public course players.

Amarillo public course players, 'in appreciation of the mayor's interest in the links, have named the new Amarillo muny the Ross Rogers Golf Course.

New "Golf in Schools" Book Emphasizes Pro Instruction

"GOLF in Schools" for 1940 has just been released by the National Golf Foundation. This booklet, containing useful information on extending golf participation in schools, was mailed all golf professionals as well as to the physical education departments of all high schools and colleges in the United States.

The book emphasizes the need of competent golf professionals in school instruction work and contains among other interesting informative articles, one by Ray Hall, chairman of the PGA committee on college and high school golf, outlining the methods successfully employed in teaching high school and college classes fundamentals of the game.

Space is also given to the Pasadena plan of coordinating schools and municipal courses, and an article by Tom Walsh, PGA president, points out the part professionals in America are taking in the national program of increasing participation in golf by the student bodies of schools and colleges throughout the country.

Any pro who has not received a copy of "Golf in Schools" may obtain same by addressing the National Golf Foundation, 14 E. Jackson Blvd., Chicago, enclosing 5c to cover cost of mailing and handling.