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LIFTING SOD BY THE OLD HAND METHOD

Re-Sodding *of* Putting Greens

By DONALD JUNOR, *Greenkeeper*
Portland Golf Club, Beaverton, Oregon

IN PREPARATION for the Western Golf Association Amateur Championship, which is to be held at the Portland Golf Club, July 13th to 18th of this year, it was desired to remodel and re-sod one of the greens. As the completion of this work with the most modern equipment afforded such a striking comparison both in the matter of time and cost with a similar change made on one of the other greens sometime ago, we are passing on the methods employed and costs for the information of others, as all clubs—and the greenkeepers in particular—are interested in keeping their maintenance and construction costs at a minimum.

With this article are two photographs; one showing the April, 1931, operation and the other showing the older method, and in each case the amount of sod removed and re-laid was the same, of an approximately 6,000 square feet area.

As will be noted in the photograph of the older operation, a crew of five men was used; one man to cut the sod along a board with an edger; two men to remove the edged sods with sod lifters; and two men carrying the sods to the leveling and trimming frame and slicing them to an even thickness with a scythe blade. With this method the capacity did not exceed 2,000 square feet of 12″x15″ sods per day; in fact the records shows that it took just a trifle over three days to remove, trim and level the sod ready for re-laying. Likewise with the small sods, it took the same five man crew just a bit under two days to re-lay the green surface. Incidentally, the records show that the labor cost for the removal and re-laying of the sod was $102.50, with an elapsed time, as stated above, of five days.

Compare the photograph of the 1931 operation with that of the older operation. You will note that the new method used only a three-man crew; two men on a hand-power sod cutting machine called the "Sod-Kut," and one man rolling the cut sod into four to five-foot lengths. It is most interesting to note that, except for the cross-cutting into these easily handled lengths, absolutely no trimming or leveling was necessary, as the sod came from the machine with straight, even edges and a uniform depth immediately available for re-laying. It is a matter of record that the entire 6,000 square feet of sod were cut in less than three hours.

This sod-cutting machine cuts an exactly uniform 13½″ width in long strips, which are then cut into four to five-foot lengths for easier handling. A four-man crew was used for re-laying and this was accomplished in a little less than a day, a greater speed being made possible by the four to five-foot lengths. The records show that the labor cost for the removal and re-laying of the sod in this operation was $21.00.

Certainly this is a striking comparison, particularly since the sod handled was identically the same type; the same labor scale was in effect at both times, and relaying conditions were equal. The saving was $81.50 in labor cost and the work was accomplished in three and one-half days quicker time.

This information is passed on with the thought that it may be of assistance to other greenkeepers in the solving of their problems; and, in this connection, the writer takes this occasion to express his thanks and appreciation for the many helpful suggestions he has received from other greenkeepers through the columns of the NATIONAL GREENKEEPER.

LIFTING SOD WITH THE NEW SOD-KUT MACHINE
The author states that 6,000 square feet of sod was cut in less than three hours with only three men.

GREENKEEPING—TODAY *and* TOMORROW

By PROFESSOR LAWRENCE S. DICKINSON
Assistant Professor of Horticulture, Massachusetts Agricultural College; Professor in charge of Greenkeepers' School, Massachusetts Agricultural College; Honorary Member of the National Association of Greenkeepers of America.

CHAPTER III.—SIMILARITY BETWEEN GOLF COURSE MAINTENANCE AND FACTORY OPERATION

"How are the greens today?"

That question is asked many times during the golfing season. "How is the course today?" is another familiar question. "Why can't we have as good a course at Blank," is a question that always invites criticism of the home course, and too frequently, criticism of the Green committee chairman and greenkeeper.

Those questions are analogous to "How's the market today," "Has American Can gone up," and "Why doesn't Down and Out company pay dividends." All the questions noted are either directly or indirectly influenced by the eagerness to receive dividends and to cut coupons. There is a business and competitive influence present.

The same member who destructively criticizes the greens will offer apologies and excuses for the failure of some stock to rise, or manufactured product to just miss being the best. He has by knowledge about business and appreciates its difficulties; even becomes sympathetic, and aggressive against criticism. His knowledge forbids destructive criticism, and very likely if he could be shown that there is a similarity between manufacturing and golf course management, he would become a booster of the club and a constructive critic.

GIVE GOLF BUSINESS CONSIDERATION

The increasing large number of pay-as-you-play, and semi-public golf courses makes it very important that golf should be given a business consideration. The general business depression has curbed the carefree attitude of the playing members, causing them to consider the value received from their investment in membership dues and time while playing.

To many clubs, and particularly to greenkeepers and Green committee chairmen, the present hard times will in three years from now be considered as a blessing in disguise. By that time they will be obtaining full benefit from the sound business methods of management that are being forced upon some clubs because of their financial condition or are being adopted by others because of the influence of school and magazine propaganda and progressive greenkeepers.

A golf course and a factory can be compared, for both are producers, and both have consumers who become satisfied or dissatisfied customers. Both have operating costs, cash receipts, sometimes cash dividends, and inventory value, a number of stockholders, and a board of directors. Furthermore on each golf course, as with each factory there is a trade name and a "special brand" of product. Also each has its type of customer, all greatly affecting the cost and standard of maintenance.

GOLE COURSE IS THE FACTORY

The factory is the golf course. The terrain with its physical advantages and disadvantages; the landscape attractiveness; the drains; water system; turf nursery; soil; and tool shed.

Improvement, neglect, or loss of any one part of the golf factory is comparable to additions, alterations, neglect or fire in factory management. The costs and results are greatly affected by any change. Manufacturers spend thousands of dollars to alter or build additions to their plants, either

to produce more of the same quality at a less cost, or to produce better quality at the same or less cost. The factory plant cannot be "run down" or poorly managed without a falling off of customers.

Golfers withdraw their stock (membership) in one course and invest it in another whose factory (golf course) is better. One hundred dollars invested in a correctly located and built drain, could easily pay 25-40% on the investment in lowered cost of maintenance and golf balls retrieved, plus player satisfaction.

MACHINERY OF THE GOLF FACTORY

THE general architectural design of the course and the physical condition of the tees, rough, fairway, and greens can be termed the machinery of the golf course. Like all machinery they should be sufficiently large to carry the load, well oiled (clipped) and kept in good repair (fertilized). No Green committee chairman will permit neglect of the machinery of his factory because such neglect would affect the costs and results of his product and therefore the dividends. The same Green committee chairman, forgetting for the time being his business ability, might cause neglect of certain of the golf course machines, and make alterations on others that will greatly increase the costs, if the results are to be kept up to a standard.

A factory usually has a superintendent, several foremen, and a number of laborers for its operating force. Because there are a number of men at work in a factory, the factory building is large and the machinery looked upon with admiration and awe, no one thinks it strange that the superintendent receives a large salary or does little physical work because he is a trained man and must spend his time directing the various operations to see that no errors are made.

The golf factory is operated by a greenkeeper and a few men. The greenkeeper possibly has some time to do physical work, but it is his particular job to see that the cultural treatment of the course is correctly done. He must be just as much of a trained man in his line as the factory superintendent, for his product is not one that can be repaired quickly or if an error is found, be rejected.

GREENKEEPER MUST OUTGUESS WEATHER

ERRORS in golf turf management are slow in appearing. The greenkeeper must be able to "out-

guess" the weather, and no one should forget that he is trying to produce a product that depends entirely upon *living grass* for its greatest selling factor. The greenkeeper, unlike the factory superintendent, must have training in many phases of his work, because he has to personally supervise the workmen. His office work is equally important with that of a factory superintendent.

Both factory and golf course have tools to help them with their production. The greenkeepers' tools are the mowers, tractors, fertilizers, sprinklers, compost pile and other similar items. The greenkeeper must see that these tools are efficiently used, and well cared for.

The product of a factory is something that is tangible, something on which a monetary value can be placed. Under ordinary conditions the product is sold at a profit which is shared among the stockholders as dividends. Each year the physical condition of the factory is recorded in a record book and a monetary value charged against it.

The golf course factory also produces. Its products are not tangible, no money value can be placed upon them, (except on side bets) for the products are health, pleasure, happiness, a certain form of religion, and low scores. If the product is satisfactory today, the factory (course) is in excellent condition, but if indigestion causes the product to be distasteful why that same factory (course) is in "terrible condition."

"Unfortunately golf clubs do not take an inventory of their factory (physical condition of the course) and record it in a book, so there is no way of telling what the stockholders (playing members) can divide as stock dividends (better playing conditions). They should do so.

The amount of money invested in a golf course is comparable to that invested in a large business and because the golf course (unless it is a pay-as-you-play or municipal course) pays no money dividends it should not be permitted to operate as a "hit and miss," "everybodys" and "nobodys" business affair. There is as much business in golf course maintenance as in manufacturing a pair of shoes.

Next Month—Chapter IV.—The growth and probable future development of the golf course factory.

Some Water Relations of Turf Plants

By DOCTOR HOWARD B. SPRAGUE, Agronomist

New Jersey Agricultural Experiment Station, New Brunswick

Read at the 5th Annual Educational Conference of the National Association of Greenkeepers of America held at Columbus, Ohio, February 3-6

WATER is one of the most important substances connected with life in this world of ours. The plant uses water in some form at every stage in its life period. Germination cannot proceed without moisture, and the first organs produced by the growing plant are roots for the absorption of water.

Water makes up 50 to 90 per cent of the growing grass plant on fairways, tees, and greens. Even such structural parts of the plant as cell walls, vessels for translocation of food materials, fibers, and tissues for mechanical support, etc., are produced in the plant by combining water with other substances. Approximately 35 to 55 pounds of water is required for every 100 pounds of such tissues formed.

DR. HOWARD B. SPRAGUE

The material which plants use as food, principally the starches and sugars, require 55 to 60 pounds of water for every 100 pounds of food manufactured. The plant's food is actually made in the leaves of the plant, but this process can only take place when the cells and cell walls are kept moist with water. The nitrogen and minerals which the plant must obtain from the soil, and which is frequently added in the form of fertilizer, only enters the roots when dissolved in water. These minerals are transported to the various parts of the plant in a stream of water which extends from the roots, through the stems, to the very surface of the leaves.

The food manufactured in the leaves is carried throughout the plant wherever needed, but only as it is dissolved in water. The combination of sugars, starches and other substances with the nitrogen and minerals to form protoplasm and cell walls for new cells, in roots, leaves and stems, takes place only with an abundant supply of water.

When the plant finally dies, it is decomposed by bacteria and molds which also require moisture for their activities. In nature, the decaying plant is broken down to its elemental components, which are water, carbon dioxide gas, and minerals. At an intermediate stage in this process of decay, humus is produced. When added to the soil, this decayed organic matter greatly modifies its water holding capacity, and other physical properties.

SEASONAL SUPPLY OF WATER

SINCE water plays such a vital part in the life of plants, it is extremely necessary that we consider the problem of providing sufficient moisture for normal growth. We have two principal sources of water on golf courses; one is natural rainfall, and the second is irrigation by some one of several systems. The goal that greenkeepers and others interested in turf management should bear in mind is that natural rainfall must be supplemented by irrigation, *only* to the extent necessary for moderate growth, and never in excess. The critical season of moisture deficiency in the northeastern states usually comes in June, July, and August, because of the relatively low efficiency of the moisture which is applied in this period.

The rate at which water is lost to the air by evaporation largely determines the efficiency of rainfall. The comparative figures for rainfall and evaporation for the 5-year period from 1924-1928, inclusive, are given in Table 1 for 5 locations in the eastern United States. Whenever evaporation is greater than rainfall, artificial watering is required on greens. If evaporation is 1½ to 3 times as great

who may be a bit nervous when performing before a crowd on the first tee, will probably dub the shot, thereby causing congestion. As he goes round his confidence grows.

There are two kinds of two-shot holes: (1) Where the green can be seen from the tee the whole time, with any one of the following contour formations:

a. Level from tee to green.
b. Ground falling away from tee.
c. Continuous rise from tee to green.

In some instances there may be a rise for the green to be built on, which is rather good.

(2) Where the green is blinded from the tee by a rise in ground on which the first shot would land. The tee should then be placed so that when the player, after his first well-played shot arrives at the ball's resting place, he can see the green for an approach shot. Either type of hole is quite all right.

LENGTH OF HOLES SHOULD VARY

THE length of the holes should be as varied as possible, for example, say you have the first hole 420 to 450 yards in length, the second might be 360 to 370 yards, the third hole being a short hole of 160 yards, to be played in an opposite direction, and so on, thus getting some of the holes against the prevailing wind and others with the wind.

Every advantage should be taken of all the natural elements and features of the land. For instance, one might get a very beautiful natural site for a green, entailing very little work, with the exception of creating traps to guard the green. The natural is infinitely more beautiful than the manufactured.

I like to have four short holes in the eighteen with lengths of approximately 140, 160, 190, and 220 yards. On no consideration would I build a *blind short hole*, the first reason being that as short holes are usually spectacular, the possible beauty of the green would be entirely lost, and the second reason being the moral effect on the play.

Take two players starting out to play a blind short hole—the first player gets a good shot, but the fact that his opponent does not see whether the ball goes near the pin or not, gives the opponent confidence. He plays and probably gets as good a

shot as the first player, whereas if the green were in plain view and the opponent could have seen the first player's ball roll beautifully close to the pin, the probability is that he would take extra precaution and care to do as well, and muff the shot.

Now one more point regarding short holes—the selection of locations for these should be over a gully or on a side hill. Sometimes a very fine short hole can be constructed on a side hill if this is at all possible.

Lastly—I like to create at least one three-shot hole in the eighteen of an approximate length of 560 yards.

THE CREATION OF BUNKERS

Now a few comments on the creation of bunkers or traps. I have drawn several types of holes showing the bunkering through the fairways which will speak for themselves.

In the construction of traps through the fairways, first let me say that there should be no hidden traps. The sand should be thrown part way up the back of traps so that they can be clearly seen from where the shot is being played, that is if the hole is being played correctly.

If the traps are on fairly level ground and the banks are up about the level of the ground, they should be well drawn out so that the fairway machine can do the most part of the cutting. All this drawing out of grades means more initial expense, *BUT* it will be found to quite justify itself because it will certainly reduce the cost of maintenance.

CONSTRUCTION OF THE TEES

Now a few remarks with reference to my opinion on the construction of the tees. If the drive is to be an uphill one, the tee should be made lower in the back than the front. Regarding shape—it should not be square in shape. Anything square on a golf course is an eyesore. Rather should it be oval or irregular in shape with the grades pulled well out. When coming off the green and going to the tee, the eye should be attracted by the tee-box rather than the tee itself.

Regarding size—the tee ought to be almost as large as the green, say thirty yards long by twenty yards wide, kept as low as possible and if built on a side hill, the grades to be pulled out as far as pos-

sible. There are two main advantages in creating large size tees, one from the standpoint of play, the other from the standpoint of maintenance cost.

From the playing standpoint, the large tee lends variety to the play in that tee plates can be moved forward when a strong wind is blowing toward the tee where there might be an impossible carry over one of the traps with a small-size tee, or plates can be moved a distance back in the case of a following wind which with a small-size tee would probably make the same trap ridiculously easy.

From the standpoint of maintenance, with the large size tee, by the time the tee plates have been moved all over the expense of the tee, it gives the greenkeeper a chance to repair the divot marks.

A good way of repairing divot marks is the cutting of thin sods from the turf nursery, scraping out the divot marks with a small rounded tool, then tearing off small pieces from the sod and placing them in the marks and stamping down with the foot. This method of repair results in a very quick healing and takes very little time. The soil thus scrapped out of the divot marks can be cleaned up and carried off in a pail.

FAIRWAY CUTTING MACHINES FOR TEES

A VERY big saving in labor is effected by the use of a three-unit fairway machine for cutting the tees. It would take two men all day to cut tees of such large size with hand machines, but with a tractor and a three-unit machine, the same amount of cutting could be done in two hours. I know, because I have done it myself. The machine should be set low and kept for this purpose alone, so that it will not have to be set every time the tees are cut, thereby effecting a saving in time.

Now a comment or two on greens and their construction. The construction of the eighteen greens should be taken in hand with the objective of creating as much variety as possible in beauty of shape, in contour and in elevation.

A green should rise from front to back and care should be taken to see that the surface water will drain off to the front of the green and all edges should be slightly turned up to keep the surface water out of the traps.

Any mounds that may be constructed around the green, or for that matter anywhere on the

course, should be very wide at the base in comparison with the height.

There should be no mounds at the sides and at the entrance to the green. A sliced or a pulled ball rolling over the inside of these mounds deflects toward the middle of the green and turns a bad shot into a perfectly good one, whereas if there are no mounds there, that same ball would very likely find a resting place in the trap where it deserves to be.

If desired, the green in a short hole may be trapped all round and as a rule may be a much more spectacular affair than that in any other type of hole.

SHORT TWO-SHOT HOLE CAN BE TRAPPED

The green on a hole of say 360 yards may be constructed and designed in such a way as to be almost, but not quite, as hard to play as a short one. I would advise leaving a narrow entrance to the green. The back of green could be trapped without it being deemed erroneous as the play would be an iron shot to the green. I would perhaps include two of this kind in a round.

A green on a 400-yard hole should not be trapped at the back and the entrance should be about 16 to 18 yards in width, with traps on the side, guarding the entrance.

A three-shot hole green can be a long and narrow creation with a narrow entrance, and it would not be wrong to trap the back as the approach shot is a mashie or an iron.

DRAINING TRAPS

On trap draining, I would just like to mention briefly a somewhat interesting point which I have illustrated. In my opinion, every trap should boast a drain which takes a course round the entire base of the trap bank, instead of running a straight middle course. This drain would then take care IMMEDIATELY of water seepage through the bank and thereby insure a continuously dry center.

Now in a short discourse on types of construction machinery and construction methods, take for instance a tract of land on which there are trees, stone walls, ledge rock and swamps, the machinery I would prefer to employ on such a tract would be a drag-line or gasoline machine with a forty or fifty-foot boom and bucket capable of digging up a yard of dirt attached to the boom with a cable.