

in the City of Smoke

McNAMARA

Club, Pittsburgh, Pennsylvania

land to learn the gardening business. For ten years I combined hard work with my great love for flowers in the gardens at Convent, Roehampton, Surrey; Coombe House, Kingston on Thames, Surrey; Park Side, Ravens Court Park, Middlesex, and Riverside House, Staines, Middlesex.

In 1902 I came to the Country Club of Pittsburgh,



Number Seven,
Showing Rolling Contour of Surrounding Grounds.
Upper Right: Plowing Fairways for New Number 11 and
12 Holes.
Lower Right: Constructing No. 12 Green.

where two or three years previous a nine-hole course had been built. This was one of the first golf courses to be constructed in this part of the country, and the first tee was over a half mile from the clubhouse.

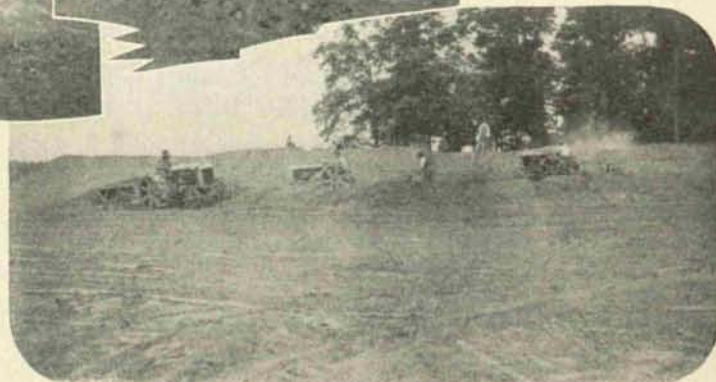
Old Time Greenkeeping

The problems we had in greenkeeping in 1902



are in strong contrast to what we have to contend with today. Greens were not cut so short, grass grew under more natural conditions, and little fertilizer was necessary. Corrosive sublimate or other worm eradi-

Construction Work at
the Pittsburgh Field
Club, Pittsburgh,
Pennsylvania.
Note hills in distance.



cators were unheard of, so we had to get rid of the worms the best way we could. The only help we had was in the use of manure and limewater to bring them out of the greens.



Pittsburgh Field Club, Pittsburgh, Pennsylvania

No farmer's wife who had to get her supply of water from a pump way across the back yard had anything on us. We had to pump our water from the creeks in barrels when the greens needed watering, as water pipes were noticeable by their absence. In 1904 or 1905 I used the first corrosive sublimate for worms, and tried out sulphate of ammonia as a fertilizer. In 1904 the club acquired some property on which I built another nine holes, and they are still playing on some of them.

In 1917 I was given a position as greenkeeper at the Pittsburgh Field Club where I have since remained.

My twenty-five years of experience have taught me that the golf courses of this country must be kept by men who have through study, observation and practical experience, learned that keeping good greens is widely different from farming or gardening. Golf turf is worn by countless feet, and much of its area is grown under unnatural conditions.

Although good greens are the mark of the good greenkeeper, I feel that a few words in defense of patchy fairways are in order.

Fairways Need Fertilization

On many courses throughout the country fairways are allowed to go year after year with a little re-seeding

here and there, but with no application of fertilizer to speak of. Turf is a greedy crop, and unless the elements upon which it feeds are replaced in the soil as fast as they are used by the grass plants, no amount of re-seeding will produce an even healthy growth of fairway turf. After a time, the club members wonder why the fairways have so many weeds and so little grass. Fairways must be fertilized every two or three years, if the grass is to maintain a thick stand and keep the weeds out.

Another direct cause of prevalence of weeds on some fairways is rolling while the ground is too wet. I have always preached this to the chairmen of the Green, but many still have in their heads that fairways must be rolled before they get too dry. There are many times spots on fairways which should be on the dry side before rolling. Thereby the grass on these spots is saved, instead of pinched out and leaving a space for weeds to take possession of as soon as rapid growth starts.

There is good equipment now on the market for golf courses, but manufacturers should devote some time to designing a good fairway top-dresser. Spreading top dressing by hand is an expensive process, but fertilizer must be applied if we are to maintain good fairways.

The A B C of Turf Culture

Physical Properties of the Soil and Their Effect on Turf Production

By O. J. NOER

Fellow, Department of Soils, University of Wisconsin

Author's Note: It has been my privilege to learn the theoretical side of turf culture, and after that to test that knowledge in practical field work on the farms and golf courses of the Middle West. The publishers of THE NATIONAL GREENKEEPER tell me that I can help the greenkeepers to a better understanding of their problems. I am willing to try, and if my readers are interested and want to ask questions about turf culture I shall be glad to answer them through the columns of the GREENKEEPER.

The soil as indicated in a previous article consists of mineral particles derived from the waste of rocks, humus resulting from the decay of plant and animal residues, and spaces between the individual soil particles which contain air and water. The size of the individual soil particles, and the way in which they are arranged greatly affect the producing power of the soil.

Size of Soil Particles Determines Texture

The texture of the soil depends upon the size of the individual soil grains.



O. J. Noer

Many soil properties, such as water holding capacity, workability, and power to supply the plant with essential mineral food elements depend upon texture. For practical purposes the individual soil particles are arbitrarily grouped into classes based on size. The limits of the different groups are determined by the relative value of the various sized particles in affecting the physical properties and crop producing power of the soil. Seven groups are recognized, namely—fine gravel; coarse, medium, fine and very fine sand; silt and clay. The relative size of the particles of these seven different groups is illustrated below. Actually the various particles are 1/800 the size represented. The number of fine particles in a

given volume is very great. In one gram (453.69 grams equal 1 pound) there are the following number of individual particles for the classes indicated.

Clay	45,000,000,000
Silt	65,000,000
Very fine sand	2,000,000
Coarse sand	2,000

With these enormous differences is there any wonder that differences of texture exert such an enormous effect upon the properties of the soil. Sand and clay are most important, so some of their distinctive properties deserve special attention. Humus exerts a marked effect on soil structure but will be dealt with in a future article.

Sand

Sand consists mainly of grains of quartz, although other minerals are also present, especially in the fine grained sands. Due to the abundance of quartz, sands are generally low in plant food constituents. Considered in the mass the chief characteristic of sand is its lack of coherence, or ability to retain its form especially when dry. Soils containing large amounts of sand have a low water holding capacity, and are not well adapted to turf for reasons which will be considered under soil moisture.

Clay

The finest soil particles constitute the group clay, a material possessing unusual properties, which are most apparent when clay is puddled, or worked, when wet. In puddled clay the individual particles are so closely packed that even thin layers prevent the passage of water. Moist clay is plastic and can be worked into shapes which it still retains upon drying, and the mass becomes very hard and tenacious.

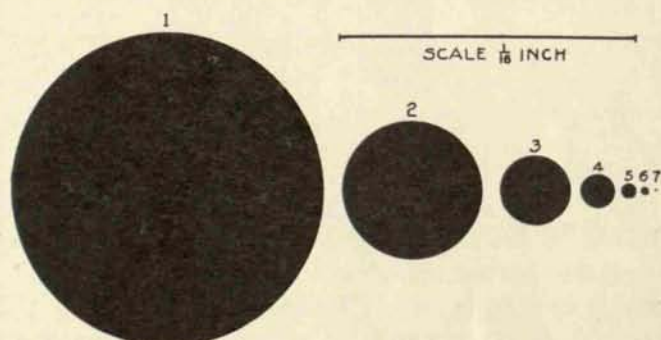
If a small amount of clay is rubbed up into water, the water becomes clouded and even after long standing the minute clay particles still remain in suspension. The addition of small amounts of certain substances cause the fine suspended particles to clot or form larger aggregates which rapidly settle to the bottom of the container. This power of clay to clot or form larger aggregates occurs in the soil mass and plays a very important part in the management of soils high in clay. When the clay is in the state of aggregation the soil behaves as though it were composed of coarser particles. Just as the potter works clay to break the aggregates into the ultimate particles to make the clay more plastic, so working clay soils when too wet destroys the aggregates and makes the soil more clayey than before. The soil then becomes more impervious to the passage of water and air, and dries into hard, tenacious lumps. To make it more tractable is difficult and requires time. It is accomplished by the action of weather, such as freezing and thawing, alternate wetting and drying, the incorporation of organic matter, and the action of lime is particularly effective.

Soils Grouped Into Classes Based on Texture

The fact that soils consist of a mixture of different sized particles is generally recognized. Yet a soil may contain a large proportion of particles of uniform size. Thus a sandy soil contains a large proportion of sand, and the larger the proportion the coarser the sand. A clay soil contains a large proportion, but not necessarily a larger proportion of clay than material of any other size, because a given amount of clay has a larger effect upon the properties of the soil than the same amount of coarser sand particles. For practical purposes, soils are grouped into the following classes based on texture.

Sands (Usually Poor Turf Soils)

Contain 80% or more of sand; 20% or less of silt and clay. A sand may be coarse, medium, fine, or very fine depending upon the predominance of the different groups of sand particles.



Relative Size of Grains of Different Classes

1. Fine Gravel039 - .078 inches
2. Coarse Sand019 - .039 inches
3. Medium Sand01 - .019 inches
4. Fine Sand004 - .01 inches
5. Very Fine Sand002 - .004 inches
6. Silt0002 - .002 inches
7. Clay	less than .0002 inches

Loams (Generally Good Turf Soils)

Sandy loam contains 20 to 50% clay and silt; 50 to 80% sand. Loam contains 20% or less of clay; 50% or less of silt; balance sand.

Silt loam contains 20% or less of clay; 50% or more of silt; balance sand.

Clay contains 20 to 30% clay; 50% or less of silt; balance sand.

Clay, over 30% clay; balance silt and sand.

With a little experience it is easy to place a soil in its proper class right in the field. Texture is judged by rubbing the soil between the thumb and finger and with experience one soon becomes expert in judging the size of the soil grains.

The best soils for golf courses are undoubtedly the sandy loam, loam and silt loams. Sands are not well suited to turf, and although good turf can be obtained on the clay loam and clay soils, these soils require very careful management.

How Soil Texture Can Be Modified

The only feasible method of modifying soil texture

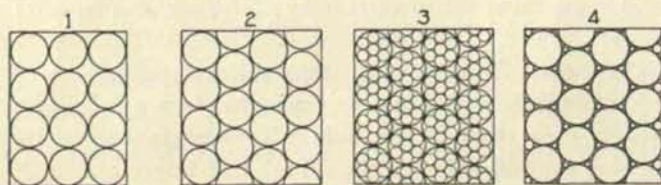
is by adding to it material of different texture. Obviously the huge expense generally prohibits such practice on fairways, but it is entirely practical in the preparation of soils for greens. It is necessary to add more sand to a fine textured soil, than clay to a sandy soil, because clay exerts a greater effect than the same amount of sand. The importance of modifying soil texture before planting greens is especially important, because texture is not easily modified after turf is once established. I have been asked to make fertilizer recommendations for greens, when the poor stand of turf was actually due to the unfavorable soil texture. Fertilizers do not materially improve turf on such greens.

Soil Structure Depends Upon Arrangement of Soil Particles

While texture is of great importance, the arrangement of the individual soil grains is also important. Texture refers to the size of the particles, but the arrangement of the grains determines soil structure. The structural condition influences the circulation of air and water in the soil both of which are necessary to the normal development of turf. In clean sand each individual particle is a unit by itself and has but a chance arrangement in relation to the surrounding grains. Highly fertile soils have a marked structure. The individual grains are bunched, and more or less rigidly bound into groups, granules or crumbs. This arrangement is essential in soils of fine texture (clay loam etc.). Granulation or formation of crumb structure enables these soils to function as though they are more or less coarse grained.

Spaces Between Soil Particles

Collectively the spaces existing between soil particles is known as the pore space. Theoretically, in a soil made up of equal sized spheres in contact with one another, the amount of pore space depends solely on the arrangement of the spheres. Thus a cubic foot of marbles contains as much pore space as one of small shot with the same arrangement of spheres.



Ideal Arrangement of Spherical Soil Particles

1. Columnar order, 47.64% pore space
2. Oblique order, 25.95% pore space
3. Compound spheres in Oblique order, 74.05% pore space
4. Three sizes of spheres with closest packing, about 5% pore space

If small spheres exist within larger ones, the pore space is materially increased. This is the condition in granulated soils. Where there are spheres of several sizes, and the smaller ones occupy spaces between the larger ones the pore space is materially reduced. This

is the condition in puddled soils. By working clay soils when too wet the small particles are forced into the spaces between the larger grains. Some ideal arrangements are illustrated in the accompanying cut.

These ideal arrangements do not exist in the soil. The soil grains are irregular in shape and uneven in size. In fine textured soils the smaller particles are so light that they do not settle so closely together in proportion to their size as do the sands. The relation between texture and total amount of pore space for some soils under field conditions is as follows:

Percent of Pore Space

Clean Sand	33.50
Fine Sand	44.00
Sandy Loam	50.00
Silt Loam	53.00
Clay	56.00

Not only the total amount of pore space but the diameter of the individual pores are of importance. Together they determine the capacity of soil to retain and move water and air, as well as facilitate the extension of plant roots.

Soils Contain Enormous Amount of Internal Surfaces

The amount of surface exposed by the soil particles is of great importance, because it is from these surfaces that the plant roots obtain water and mineral food elements. The water held by a well drained soil exists as a film covering the surface of the particles, and the amount held is dependent upon the surface exposed. The mineral plant food elements are dissolved at the soil surfaces by the soil water, and other things being equal the amount of substance dissolved from a solid body is proportional to the surface exposed. The enormous extent of internal soil surface is not often appreciated. There are more than 10 square miles of surface exposed in the surface foot of an acre of coarse sandy soil, while in a loam more than 60, and in the finest clay more than 300 square miles of surface are exposed. These differences are enormous, and partly account for the greater productive power of the loam and clay soils.

Best Soils Have Granular Structure

The development of crumb structure is necessary in all soils except some of the sands. Water and air pass more freely, and it also permits of more ready penetration of the roots and root hairs. Without granulation the spaces between the particles are so small that the soil is almost impervious to both water and air. Thus if a coarse sandy soil disposes of its excess of water after a heavy rain in 2½ hours, by under drainage, the finest clay without granular structure requires about 3 months to free itself of the same amount of water in a like manner. When the fine soil particles are collected into larger aggregate grains, excess water is quickly

disposed of by under drainage, and there is an opportunity for the roots to advance between the grains, and absorb the plant food and moisture contained in them. Each aggregate acts like a tiny sponge which maintains itself full of water highly charged with plant food materials to be sucked out by the root hairs as they advance alongside them.

When new fairways are to be established on fine textured soils extreme care should be used in the preparation of the seed bed.

Plowing should be done when the moisture condition is such as to prevent the formation of clods. If plowed a season in advance of seeding the alternate freezing and thawing, during the winter improves granulation. If it is possible to grow a green manure crop and plow it under, the resulting humus will materially improve the soil structure.

Ideal soil conditions are most likely to occur in loam soils. These soils have some particles large enough to function separately, and others of medium size to form centers around which the smaller particles may cluster to form granules or crumbs. Thus there are a few large

pore spaces which facilitate drainage, and numberless small openings in which water is retained.

Turf Improves Soil Structure

Practical men appreciate the importance of maintaining soils in good physical condition. When seeds begin to grow there is no direct connection between the seed and soil. The small amount of plant food contained in the seed is soon expended in the development of a root system. If the seed is placed in conditions unfavorable for free development of the first roots it may succumb. A mellow seed bed, with many pores allows the roots to grow unhindered and tends to place absorbing surfaces in direct contact with the soil grains. It is particularly important to have a mellow seed bed for turf seedings. The young grass seedling must forage for itself as soon as growth begins because of the exceedingly small amount of food contained in the very small grass seed. After the soil is once covered with grass, the turf aids in improving soil structure. As the roots grow and decay, the soil particles are wedged apart in some places and crowded together in others. The grains are finally cemented together into larger aggregates and the open mellow structure characteristic of virgin soils results.

"Getting Set for the Future"

By FRANK OGG

Greenkeeper, Hillcrest Country Club, Kansas City, Missouri

I WAS born in Carnoustie, Scotland, and like most of the sons of Scotia I cut my milk teeth on a niblick. Therefore being brought up in an atmosphere of golf. I either played golf, talked golf or thought golf all my waking hours.

In 1911 hearing about the wonderful spread of golf in the United States I decided to leave the old country and come where golf has its greatest development.

My first position was with a large seed house in New York with which I was connected for some eighteen months giving me an opportunity to see all of the well known courses in the Metropolitan section. I found things considerably different than they were in Scotland. I found the courses more elaborate and I found a tendency not to rely as much on nature as is the case across the water, but rather to use man's artistry in enhancing natural effect wherever possible.

While I was with the seed company my brother, Willie, who is now at Worcester, Massachusetts came to the Dedham Country and Polo Club as Pro, requesting me to join him as assistant Pro, which I did.

First Experience with Bermuda Grass

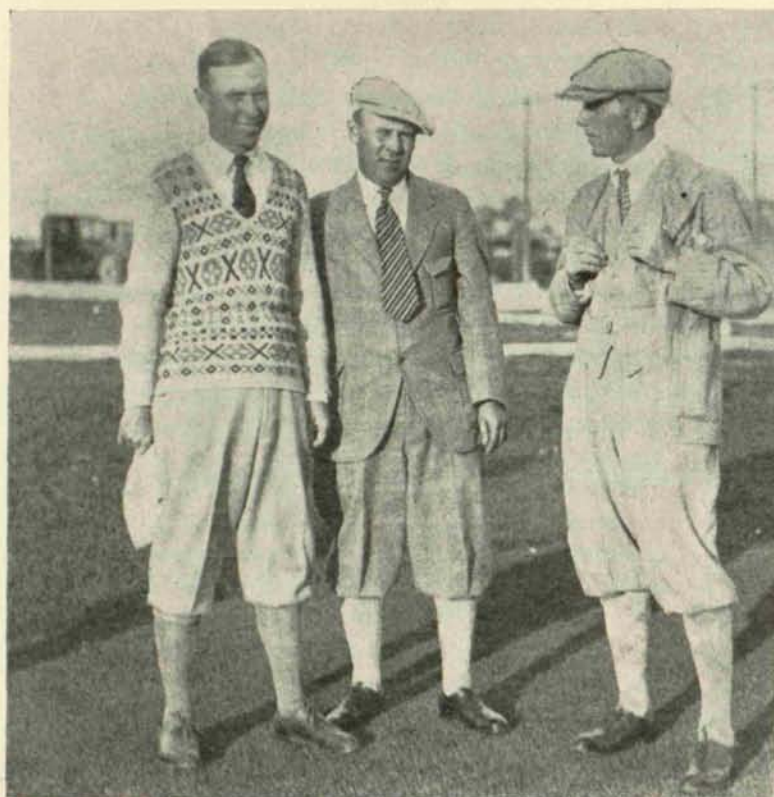
After being located there for several years an opportunity came to me to become Pro and Greenkeeper in charge of the course at the Ingleside Club at Atlanta. I had always taken a great deal of interest in greenkeep-

ing although I had no occasion to do anything of this kind at Dedham, the course having been established a long time and under the care of a competent man. I therefore welcomed this opportunity at Ingleside because I had ideas on the subject and I wanted a chance to put them into effect.

At Ingleside I found the grass thin due to lack of sufficient top dressing and found it very coarse which in that particular case was caused by an excess of moisture. This condition I began to correct showing a material improvement within sixty days and I believe the secret of good Bermuda greens lies in first finding if the proper variety of Bermuda has been planted, analyzing the soil conditions, and if the soil is such that it actually will grow good Bermuda and the Bermuda is the right variety it is only a question of care and time until the greens can be brought to the finest possible texture. In this particular case I ceased the use of artificial irrigation almost entirely, generally finding the rainfall sufficient. By carefully following this course of procedure in time I brought all of the greens to a condition of maximum effectiveness.

Ambition Aroused

About this time Dr. E. P. Hinman of Druid Hills, who had been carefully watching my work at Ingleside, sold me on the idea that there was a big field for a man



From Left to Right: Charles E. "Chick" Evans, Al Espinosa, Jock Hutchinson, and Frank Ogg, Greenkeeper at Hillcrest Country Club, Kansas City. Right: No. 6 at Hillcrest, Planted with Bent in May, Playing in August.



who made a study of greenkeeping, and during the five years I remained at Ingleside Dr. Hinman mentioned this to me from time to time. He seemed to be somewhat impressed by the results secured, which, as far as I know, had not up to that time been showing in Atlanta or in that territory. The result was that I was offered a job of greenkeeping at the Tulsa Country Club, thus getting entirely away from the professional feature of the work. With an opportunity to devote my entire time to greenkeeping, and acting on Dr. Hinman's advice, I took the position.

At Tulsa the opportunity presented itself of finishing the construction work on the first nine, and I therefore had an entirely new course to work with. Unfortunately however, in this case the wrong variety of Bermuda had first been planted with the result that the greens were coarse and it was necessary to reseed them completely. This necessitated of course skinning off the greens and doing the job entirely over. Again I found too much water being used and insufficient top dressing applied. Attention to these two features in a comparatively short time brought these greens into shape. Bermuda grass makes a wonderful turf where climatic conditions determine its use, being a creeping grass, as one Scotchman of my acquaintance defined it, "A vine, not a grass." It repairs injuries very quickly, makes a thick, dense turf, which sets a ball up beautifully and while it has disadvantages on a putting green these disadvantages can to a great extent be corrected by intelligent care of

the greenkeeper. Like all the creeping grasses if a Bermuda green is not watched it will develop a distinct growth in one direction causing the player endless annoyance on account of the fact that the green will be so fast one way and very slow the other.

However it is not my purpose in this brief article to give instructions in greenkeeping, merely to write a very sketchy discussion of the subject, making the biographical end of it as brief as possible. If it appears that the personal pronoun is often used it is because it is difficult to write of personal experiences in any other way.

Creeping Bent in Oklahoma

At Tulsa I raised for the first time, so far as I know, in that latitude, creeping bent. This bent was sent to me by Walter Travis from Warren, Ohio; it therefore had had no opportunity to become acclimated before I planted it. At the time I left Tulsa for the Hillcrest Club in Kansas City the grass was doing excellently and so far as I know is still perfect. I believe the authorities in Washington advise that creeping bent cannot be successfully raised in that latitude, nevertheless there is the grass. I certainly do not claim any miracles, I merely state the fact. This was my first experience with this wonderful grass and of course I had to feel my way,

(Continued on page 30)

What Golf Rules Affect the Greenkeepers

How the greenkeeper may help the player avoid penalties in his play.
Knowledge of certain rules and definitions necessary
to avoid complaint.

By ROBERT E. POWER

Vice President and Chairman Green Committee, Westwood Country Club, Cleveland

PART II.

THE underlying thought and intent of the law makers of golf as evidenced by the wording and interpretation of the rules of the game, favor the greenkeeper and his work. They have always appreciated that he labors under difficulties because much of his work must be done when players are on the course. Either they must interfere with him or he must interfere with them.

This irreconcilable fact calls for a compromise and to offset this the rule makers have legislated that no penalty attaches to a player whose ball finds its way among his tools or appurtenances used on the course. They say in so many words, "Don't blame the greenkeeper—he must do his work. If any of his implements or material are in your way drop your ball to one side without penalty."

That's a proper spirit I would say and all greenkeepers should appreciate it. Here's the rule as written:

Rule 11

Removal of Obstructions

Any flag-stick, guide-flag, movable guide-post, wheelbarrow, tool, roller, grass-cutter, box, vehicle, or similar obstruction may be removed. A ball moved in removing such an obstruction shall be replaced without penalty. A ball lying on or touching such an obstruction, or lying on or touching clothes, or nets, or ground under repair or covered up or opened for the purpose of the upkeep of the course; or lying in one of the holes, or in a guide-flag hole or in a hole made by the greenkeeper, may be lifted and dropped without penalty as near as possible to the place where it lay, but not nearer to the hole. A ball lifted in a hazard, under such circumstances, shall be dropped in the hazard.

If a ball lie on or within a club's length of a drain-cover, water-pipe or hydrant, located on the course, it may be lifted and dropped without penalty as near as possible to the place where it lay, but not nearer the hole—as near as possible shall mean—"within a club's length." If it be impossible for want of space or other cause for a player to drop the ball in conformity with this interpretation, he shall place the ball as nearly as possible within the limits laid down in this interpretation, but not nearer the hole. U. S. G. A.

A pile or mound of cut grass resulting from the

mowing of the course, or any other material pile for removal, is considered to be upkeep. A ball lodging in or lying on such an obstruction may be lifted and dropped without penalty. U. S. G. A.



Robert E. Power

The leniency of the above rule does not excuse the greenkeeper for leaving his tools lying around when not in use. Like a good housekeeper a greenkeeper must be tidy if he would succeed because members are very observing and they will notice and comment on a roller or mower left on the course more quickly than a badly mowed fairway. As business men they quickly recognize disorder and lack of system; immediately they form an unfavorable opinion of the greenkeeper and nothing he does creditably can erase the impression from their minds that he is far from efficient.

When compost piles stand day after day without being used and piles of grass clippings accumulate near the greens with no signs of removal, the greenkeeper can expect nothing but dirty looks and criticism from those he works for. He must watch his housekeeping duties and keep his course tidy if he desires smiles and words of commendation to say nothing of regular and substantial increases in salary.

Rule 25

Condition of Play in Hazards

When a ball lies in or touches a hazard, nothing shall be done which can in any way improve its lie; the club shall not touch the ground, nor shall anything be touched or moved, before the player strikes at the ball, subject to the following exceptions:—

(1) The player may place his feet firmly on the ground for the purpose of taking his stance; (2) in addressing the ball, or in the backward or forward swing, any grass, bent, bush, or other growing substance, or the side of a bunker, wall, paling, or other immovable obstacle may be touched; (3) steps or planks placed in a hazard by the Green Committee for access to or egress from such hazard, or any obstruction mentioned in Rule 11, may be removed, and if a ball be moved in so doing, it shall be replaced without penalty; (4) any loose impediment may be lifted from the putting-green; (5) the player shall be entitled to find his ball as provided for by Rule 21.

(The penalty for a breach of this Rule shall be the loss of the hole.)

A recognized water hazard cannot be "out of bounds." R. & A.

The physical condition of hazards on the golf course comes under closer scrutiny of the club members than most greenkeepers imagine. It's always a tough shot to get out of a bunker even under the most favorable circumstances. That's why especial care should be given to their upkeep. I can recall many good courses with fine greens and fairways but neglected bunkers.

I asked one greenkeeper at a course on the shore of Lake Erie why he didn't put sand in his bunkers. He said, "the boss won't let me, it costs too much." Yet no expense was spared to make his turf as fine as possible. Evidently his "boss" doesn't get into bunkers much or else thinks they are some necessary evil that goes with golf, but should not be encouraged.

The good greenkeeper cannot neglect his bunkers. Suppose Mack Burke at Scioto or Emil Loeffler at Oakmont had let their bunkers go during the National Open and Amateur tournaments. Every player would have been penalized every day.

Three things are very important in bunker upkeep, viz—even distribution of sand, smoothing of heel prints and washes, and elimination of stones large and small that continually work into bunkers in some unaccountable way. Small stones may appear harmless but they tend to deflect the club blade slightly and ruin the accuracy of a well played shot.

You will note that steps may be removed without penalty. That's a good rule and helps the greenkeeper because he can put in steps to save his banks from breaking down knowing that they do not interfere with play. More greenkeepers should avail themselves of this rule.

Finally, remember this. Visiting golfers who know anything judge the greenkeeper on two things—first, his putting greens and second, his bunkers. If the boss won't let you keep your bunkers up tell him to get another greenkeeper—one that doesn't know his business.

Rule 27

Ball in Water Hazard

Ball in Casual Water in a Hazard

(1) If a ball lie or be lost in a recognized water hazard (whether the ball lie in water or not) or in casual water in a hazard, the player may drop a ball under penalty of one stroke, either: (a) behind the hazard, keeping the spot at which the ball crossed the margin of the hazard between himself and the hole, or (b) in the hazard, keeping the spot at which the ball entered the water between himself and the hole.

Ice on the putting-green or through the green is considered "casual water." R. & A.

Ball in Casual Water Through the Green

(2) If a ball lie or be lost in casual water through the green, the player may drop a ball, without penalty, within two club lengths of the margin,

as near as possible to the spot where the ball lay, but not nearer to the hole.

If a ball when dropped roll into the water, it may be re-dropped without penalty.

Ball in Casual Water on the Putting-Green

(3) If a ball on the putting-green lie in casual water, or if casual water intervene between a ball lying on the putting-green and the hole, the ball may be played where it lies, or it may be lifted without penalty and placed by hand, either within two club lengths directly behind the spot from which the ball was lifted, or in the nearest position to that spot which is not nearer to the hole and which affords a putt to the hole without casual water intervening.

Water Interfering With Stance

(4) A ball lying so near to casual water that the water interferes with the player's stance may be treated as if it lay in casual water, under the preceding Sections of this Rule.

Want of Space to Drop

(5) If it be impossible from want of space in which to play, or from any other cause, for a player to drop a ball in conformity with Sections (1) and (2) of this Rule, or to place it in conformity with Section (3), he shall "drop" or "place" as nearly as possible, within the limits laid down in these sections, but not nearer to the hole.

The penalty for a breach of this Rule shall be the loss of the hole.

Many recognized water hazards consist of small creeks that traverse the course. These are frequently dry through a portion of the playing season and many balls driven into them are playable if the owner is expert enough to play the shot correctly. It behooves the watchful greenkeeper then to frequently go over these creek beds and keep them cleaned up and free from stones and debris. In so doing he will win the inward and heartfelt gratitude of his members and their guests who appreciate more than he can possibly realize his thoughtfulness in looking out for these "little things." A stroke saved here may mean the winning of a close match.

In the preceding installment we called attention to the necessity for draining storm water out of bunkers so that repetition here is unnecessary. The writer believes that we are coming to open drains and drain covers in bunkers and I know we will put them in at Westwood next season. It is the only way to get rid of the casual water handicap that is the curse of all play on flat courses after a heavy rain. Should a ball by any chance come to rest on or within a club's length of such drain cover the player may lift and drop it in the bunker away from the cover without penalty.

Recommendations for Local Rules Special Hazards or Conditions

When necessary, Local Rules should be made for such obstructions as rushes, trees, hedges, fixed seats, fences, gates, railways, and walls, for such

(Continued on page 35)

Curiosity Made a Greenkeeper

The Story of HUGH LUKE
Greenkeeper, Garden City Golf Club, Garden City, Long Island

MY first interest in greenkeeping came to me when I was a caddie on a golf course in the North of Ireland, where my family happened to be residing at that time. I have never been able to decide whether it was interest, or just natural inquisitiveness. However, I used to ask questions about the course which could not by any stretch of the imagination be said to be any concern of mine. Although not always getting a reply, I came back for more. After a year or so of asking questions, I was allowed to do some work on the course, as an occasional helper. From being an occasional helper I gradually became a regular greenkeeper on the same course where as a caddie I began to ask questions.

Serves on Green Committee

Later, owing to a family move, I lost touch with greenkeeping until I joined the club in my home town, Clyde Bank, Scotland. I was not long a member of the club when I was elected to the council of management and put on the Green committee, owing to my knowledge of greenkeeping. I carried on in the Green committee several years and had some heated arguments in regard to alterations and general upkeep, as I understood the

work from the greenkeeper's point of view, whereas the other members of the committee were in industrial life and had only a vague idea of how the work should be done.

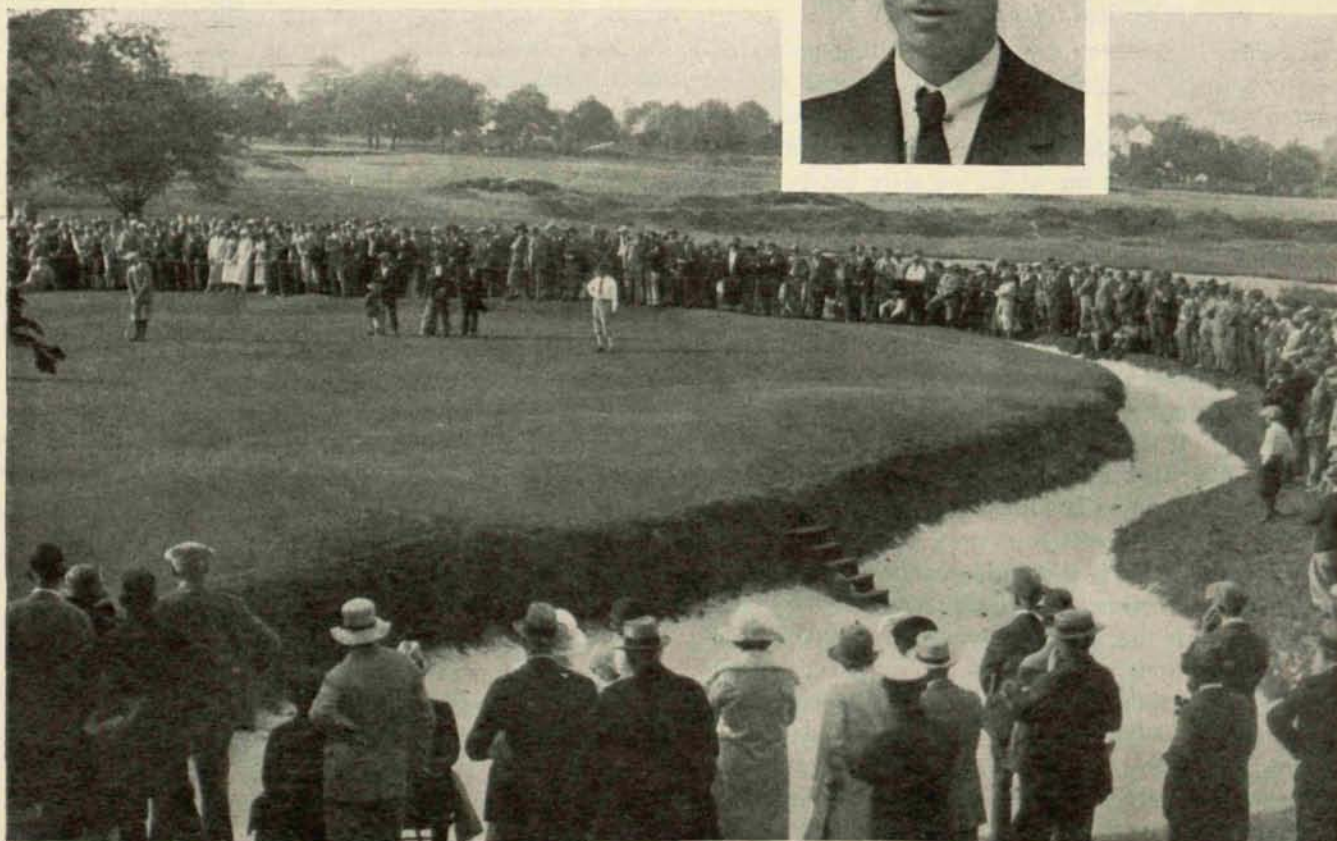
Back Home After the War

Then came the World War and over four years of army life, which event upset golf courses in common with everything else. With peace came many changes in industrial life, and along with it the re-conditioning and improvement of golf courses, among them Clyde Bank. We decided to extend the course, and we had no greenkeeper. I was offered the opportunity of taking the position as professional and greenkeeper, which I accepted.

From the start, I had most of the extension of the course to swing, which took several months to accomplish. At the end of two years, I decided to change,



Hugh Luke, Greenkeeper
at Garden City Golf Club,
Garden City, Long Island



Open Tournament Day at Garden City

although to a certain extent I was sorry to leave the club where my work had been much appreciated. However, I felt that I wished to come to the United States, where golf was gaining rapid headway.

Starts in New York State

Soon after arriving in this country, I secured a position on a new course being built at Mt. Kisco, New York, where I had charge of seeding all the greens and fairways. At this time I applied for the position as greenkeeper at the Garden City Golf Club. I started on the job in the spring of 1924, when everything was being rushed to get the course in shape for an early opening. There was also some construction work to be finished for the Open Tournament held every year at Garden City.

One green had to be built over, and as the approach to the new green was in the position of the old one, two greens had to be returfed. We had just five weeks to make our changes, and five weeks after we started the job, both greens were in play and ready for the tournament.

Since the first year, we have had a quiet time in construction work at Garden City, with the exception of altering half of one green, building seven large bunkers, and rebuilding a fairway.

Controlling Brown Patch

Our chief enemy is brown patch, and it seems to come earlier and stay later each season. Corrosive sublimate applied at the rate of one-third in two barrels of water to a green seems to give good results. During the hot dry weather, one-quarter of a pound is safer to use, and gives good control. We use a proportioning machine in applying such mixtures to the greens, which facilitates the work to a great extent. This past fall we had a severe attack of brown patch, even as late as September, when one naturally expects to be free of it.

How Our Magazine Helps

Brown patch attacks many courses here in the east, and I believe that by comparing notes through the pages of this magazine, greenkeepers will eventually overcome this trouble. Scientists are working for us, but we must make determined efforts ourselves to control the ravages of this disease, and what one greenkeeper has found out should be passed on to others. I hope to see all the members of the Association taking advantage of the opportunity our magazine offers them. It is the medium through which our problems may be discussed, so let's hear from *you*, Brother Greenkeeper.

"Getting Set for the Future"

(Continued from page 26)

nevertheless it has been my experience that unless climatic conditions are impossible any grass will respond to intelligent care.

At the Hillcrest Club where I am now located we have two bent greens on which we were playing sixty days from the planting and are expecting to put in more bent for next season.

Good Greenkeepers in Demand

It seems to me that greenkeeping affords a wonderful opportunity to the man who wants to buckle down, learn his problems and apply the same attention and intelligence to those problems that he would in a business, for example. It also seems to me and I can say it with all due modesty that a good greenkeeper is of the utmost importance if a course is going to be satisfactory to the members. The greenkeeper's work is seldom noticed unless it is wrong; it is seldom if ever praised no matter how good, but receives quick condemnation if the greenkeeper fails; so the greenkeeper must after all serve more or less through his love of the work and his joy in healthy turf, well kept traps and work well done. I do not mean to advise anybody how to conduct a golf club but I do believe the way to get the best results is to *get a good greenkeeper and then let him alone*. He should of course consult with the chairman of the Green com-

mittee on all matters out of the ordinary such as rebuilding greens, traps, removing or installation of hazards and things of that nature but in routine matters, if he knows his business, he can be trusted to handle them without interference.

It is my firm belief that this policy put into general effect would considerably reduce the cost of course upkeep because it would reduce a great deal of experimenting and thus save money.

Study and Make Good

Greenkeeping is a profession worthy of a man's best efforts, a profession which is not likely to be overcrowded for some time. There are available text books and courses of instruction from which an earnest man can obtain a great deal of sound, valuable information. These of course will not take the place of practical experience. There never will be anything to equal experience on the turf itself; nevertheless, a greenkeeper whose experience has been limited can add greatly to his fund of information by study and application of what he learns to the problems at hand. I know that it would have been of great benefit to me when I first went to Ingleside if I had had books to refer to.

Greenkeeping is interesting work. It is work that may well occupy the entire attention of any lover of golf.