All Is Not Bent That Creeps

By ELMER J. MICHAEL
Greenkeeper, Transit Valley Country Club, East Amherst, New York

MY experience in greenkeeping dates back to the time when I was two years old. At that time my father accepted the position of greenkeeper at the Country Club of Buffalo, the only club in the Buffalo district at that time, and he is without a doubt the pioneer greenkeeper of this section. Since then he has made a name for himself that is second to none in the country. His advice has been sought by many clubs and I myself have benefited very much by it.

When I was still a small boy and caddying, we used to build golf courses in the back lots. It was there possibly that my interest was aroused. We would change these around from time to time and have different layouts, building greens and bunkers and then playing on them in every spare moment.

Starts as Foreman at Eighteen

In 1914 I accepted my first position on a course. I was 13 years old at that time and my father was in charge. In the first three years during my school vacations, I did all the different kinds of work that are done on a golf course. The following two years I received my first experience at construction work at Orchard Park, the Park Club country course. It was there that I learned how the obstacles in construction and upbuilding of new courses are met and overcome. At the end of that time when in my 18th year, I was asked to take the foreman's job at the city course of the Park Club. My first year in that capacity was really a failure due to the fact that I was left alone a good deal of the time and laid out the work to suit myself. My way of doing the work did not meet with my father's approval just because it was not his way. The result was that I was in hot water most of the time. The following year we agreed that I should run the course my own way for two months and if at the end of that time it was not satisfactory, I would resign to my father's orders. This put me on my own and the result was that I was successful and we had some real competition between us.

Prefers Poa Annua for Greens

In 1922 I had my first experience in charge of construction work. We built three new holes in the old Pan American Exposition grounds. This land was really a dump. We spent many months of hard labor on it. Today it is a beauty spot. During the next three years we raised some greens on that property that are second to none in the country. It was during these three years that I began to study bent, learning many things about it. My observations showed me that all is not bent

Elmer J. Michael, Greenkeeper (center back row), with his "gang" on the Transit Valley Club Course, East Amherst, Buffalo District, New York

that creeps. Therefore we must be very careful in making use of this grass. There is only one true bent according to my estimation but there are many imitations. Personally I prefer Poa-Annua greens to those made of bent. The greens made of this grass are not subject to brown patch and make as good if not a better putting surface than bent.

On August 1st, 1925, when I was still 24 years old, I accepted the position of greenkeeper at the Transit Valley Club. I must say that I have not had an easy time of it. The course, when I took charge, was very much run down and the greens were in terrible shape. We had just three weeks in which to get ready for the Western New York Championship. In that short time we were successful in making a big improvement. But even at this time it is far from perfect. We have done considerable remodeling. The course is very low and have had to do a great deal of tiling. During the last season, the players seemed very much pleased and intimated that our course ranked second in the district.

All Greens Differ—Study Them

At the time I took over the position, we had very little good compost. It was all very green. The result was we raised a good crop of weeds and have had to keep at them continually. It is here that I would like to say that sulphate of ammonia cannot be used during the summer months on our course, except in such small quantities that it is not beneficial. I find that bonemeal gives me the best results. I do not use any set time for top dressing nor any set amount per square yard because of the varying nature of the greens. I feel that a greenkeeper must study his greens and give them what they need when they need it. If the greens are not all built of the same material they will not always take the same treatment. After working here and trying to use the same methods as I did at the Park Club, I find they are not practical. What will work on one course will not always work on another.

A few of the things that I think are essential to a golf course are:

1. That it should be kept scrupulously clean at all times from debris, paper, small piles of dirt, etc.

2. That the trees and shrubbery, especially on the line of play, be kept trimmed and free from dead wood.

3. That everything should have a place and be kept in that place, that the tools whether they are the best or not should be kept looking neat and in good working order.

4. That the men must be thoroughly instructed so that they may be able to discharge their duties properly.

5. That the greens should be kept free from weeds and other obnoxious grasses and also well watered. The watering preferably done at night.

No Other Position Where Demands Are So Varied

My belief is that a better name for a greenkeeper would be a golf course engineer. He has to have a knowledge of many things to work efficiently and keep expense down to a minimum. He must be a carpenter, machinist, mason, plumber, electrician, farmer and greenkeeper. There is not another position in the world that requires all this from one man. So far since I have been at Transit Valley Country Club, I have not hired a mechanic of any description outside of our general run of labor. I have studied these various jobs from many angles and can instruct the men I have to handle in any of the work I have mentioned. Therefore the position of a greenkeeper is full of interest at all times. It keeps one thinking, working, busy and happy with a desire to do still bigger things in life.

All Questions
On Problems of Greenkeeping
Which Have Been Received From Members
Will Be Answered in the
May Number

Send In Your Questions and Watch
The "Clearing House" Grow!

The A B C of Turf Culture

The Functions of Organic Matter in the Soil

By O. J. NOER

THE importance of supplying the soil with organic matter is generally recognized by the greenkeeper, but some of its functions are not always clearly understood. Organic matter is the great natural source of nitrogen for turf, but it also affects the physical condition and water-holding capacity of the soil. Almost all of the organic matter exists near the surface and is the chief characteristic of all soils. The absence of organic matter, and the bacteria associated with it, is one of the chief reasons why the deeper soil layers fail to support plant life when brought to the surface. Generally speaking, soils well supplied with active organic matter are fertile soils.

O. J. Noer

Editor's Note: For the past four years Mr. Noer has investigated the value of various fertilizers in relation to golf turf at the Soils Department, University of Wisconsin, under a fellowship established by the City of Milwaukee.

Decay of Organic Matter Produces Humus

The surface layer of soil constantly receives additions of organic matter, either leaves or other debris from vegetation growing on the soil, or manure and other animal or vegetable residue added in the form of manure. In the soil, these materials soon lose their original structure and break down into dark colored substances called "humus." Since the dark color of most soils is due to humus, color can be used to obtain some idea of the amount of humus in a soil. Light colored soils always contain less humus than dark colored soils. That humus is, essentially, a product of bacterial decay is shown by the fact that its formation ceases when mixtures of soil and organic matter are sterilized with antiseptics or by heat. The upper soil layers where organic matter is abundant contain hosts of bacteria but with increasing depth, they rapidly diminish. The number of bacteria in the surface layer of a fertile soil is almost inconceivably large. A teaspoon often contains millions of these minute organisms. Provide a suitable environment and they become ceaseless workers.

When organic matter is added to the soil, the changes which it undergoes depend upon the conditions of aeration, drainage, temperature and cultivation. With suitable temperatures and abundant supply of air, the organic matter may be completely resolved into simple substances with much the same final result as though it had been placed into a furnace. Naturally, such conditions do not favor the accumulation of humus. With a more limited supply of air, destruction of the organic matter is not complete and a portion of the original material persists as humus. In the soil, both types of change go on. More humus is found in soils continuously in turf than in a continually cultivated soil because of the differences in the amount of air admitted into the soil. Clays contain more humus than sandy soils through which air is always being drawn, and the accumulation reaches its maximum in water-logged soil when access of air is effectively cut off. This is the condition existing in marshes and it is here that muck and peat are produced.

Humus Main Source of Nitrogen

Humus is the great source from which plants obtain needed nitrogen and since all plant and animal tissue contains nitrogen, the soil supply is increased whenever vegetable or animal matter is applied to the soil. The air above the soil contains huge amounts of nitrogen but legumes are the only plants which can utilize this nitrogen, and since clovers are discouraged on golf courses, this inexhaustible source cannot be drawn upon. During electrical storms, some nitrogen of the air is converted into available compounds and washed down in rains. The soil supply is thus increased by from 5 to 10 lbs. of nitrogen per acre annually—amounts which are insufficient for golf course turf. A group of bacteria exist in the soil which are capable of assimilating free nitrogen of the air but there is no definite information as to the amount which may be fixed. It is safe to say that it is not sufficient to supply the demand of the turf. The use of nitrogenous fertilizer must be resorted to when soils are low in humus and nitrogen.

How Nitrogen of Humus is Made Available

The nitrogen in humus exists in organic compounds largely insoluble in water and not directly available to the turf. This nitrogen must be converted into other forms. During decay, the soil bacteria convert the organic nitrogen first into ammonia, the form of nitrogen in sulphate of ammonia, and then a special group of

bacteria change the ammonia into nitrate nitrogen. This is the form preferred by most plants. Unfortunately, nitrate nitrogen, unless taken up by the turf, leaches out in the drainage water and is thus lost. Storing nitrogen in humus is a wise provision of nature to guard against excessive loss.

Very often dark colored clay soils, even though they contain considerable humus, may need nitrogen, especially if they have been cropped over considerable periods. The remaining humus resists further decay and fails to yield sufficient nitrogen to satisfy the demand of the growing turf.

The transformations which nitrogen undergoes in the soil form a cycle. Plant or animal residues decay and nitrogen is released in forms which the growing plant may again utilize, or it is lost in the drainage water. This process repeats itself each season but some loss occurs constantly. A part of this is replenished by air nitrogen washed down in rains and as a result of the activity of certain groups of soil organisms. When legumes (clover, beans, peas, etc.) can be grown frequently, the soil supply can be maintained because the minute bacteria contained in the root nodules draw upon the inexhaustible supply of the air and convert it into forms which the plant can utilize. Since clover is discouraged on golf courses, this means of gathering nitrogen is not available and the soil supply must be maintained by resorting to the use of fertilizers.

Factors Affecting Decomposition of Humus

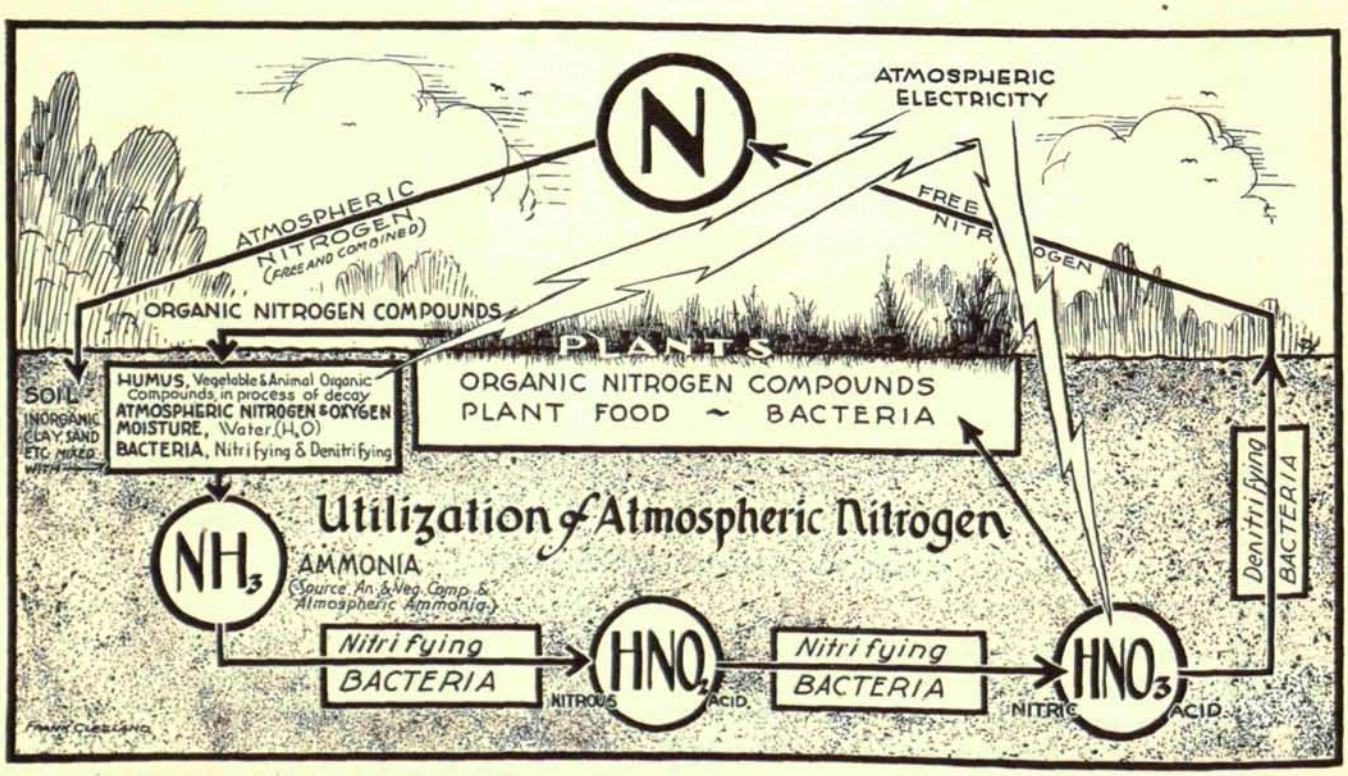
These processes of decay with the resulting formation of available nitrogen in the form of nitrate, do not take place at all times. In winter it practically ceases, and during cool spells or when the soil is quite dry, the rate may diminish to a point where the growing plant fails to obtain an adequate supply of nitrogen. The bacteria responsible for decay resemble plants in that they also require a favorable environment to enable them to perform their work. They work best when the temperature is in the neighborhood of 70 to 90 degrees fahrenheit. Below or above this their activity diminishes until it ceases. These micro-organisms require water, and free aeration of the soil to supply needed oxygen. The presence of a base in the soil, such as lime, to neutralize the acids they produce, also promotes more rapid decomposition.

Attention has already been called to the factors which promote the accumulation of humus. They are exactly opposite to those which produce decay and liberation of nitrogen. Decomposition must take place if normal plant growth is to continue, so it is necessary to maintain an adequate supply of organic matter in the soil. This is not so difficult as it might first seem.

Humus Helps Soil Withstand Drought and Holds Plant Food

The amount of water humus can hold is large and may exceed 100 per cent. However, much of this water is unavailable. Plants growing in peat (almost entirely

(*Continued on page 36*)



The bacterial cycle, showing how the main supply of nitrogen available to turf is derived from animal and plant residues, and converted into digestible plant food. Clover, alfalfa, and other legumes supplied with root nodules have the power to absorb and fix atmospheric nitrogen drawn from the air by electrical energy

From Sand To Bent Greens

By CHARLES HUDDLE
Greenkeeper, Crestview Country Club
Wichita, Kansas

Charles Huddle

AFTER searching the pages of the "Greenkeeper" and getting a lot of valued information from our brother greenkeepers, if you will permit me space I will endeavor to give you just an outline of the history of our course.

I came to this club four years ago on February 13th, 1923, and at that time we were playing sand greens, forty feet in diameter, which had been plowed out with a turning plow, oiled and sanded. As our readers will readily see this put the base from four to six inches under surface. So after every rain the only thing to do was to take all our men, buckets and a large pump off a threshing machine tank and bale the greens out, getting them ready for play—*and oh, such play!*

So the first thing we did was to employ trams, wagons and extra men and fill the old greens up to surface, roll, oil, tamp and resand, which brought them up to good condition or as good as a sand green can be made. In June 1925, we had the State meet at our Club and by this time we had by the use of a railroad rail and road grader sand greens that were pronounced the best in the middle west. In fact the Golfers Magazine wrote the chairman of our committee for an article on sand greens which he willingly contributed.

Planting Columbia Bent in Kansas

On the face of this and a successful tournament the President of our club and chairman of our committee got their heads together and that fall we planted nine grass greens to Columbia bent stolons. They were covering the ground by cold weather, in fact we mowed them all twice. These first nine greens we built by donation, so after they started through the winter so well we began excavating January first, 1926 for the second nine, planting the first three on March 16, and two a day each succeeding day until finished. We played the first nine or fall planting April 15th, and the spring planting or second nine we opened July 4th. They played perfectly and I want to add that Crestview was happy over what we had achieved. We have produced in this short period of time such a wonderful turf that we have played it all winter and on February 22nd, we had a play equal to July 4th. My greens stood up well and look fine.

Good Care Brings Results

As to care all summer I top dressed with a mixture 50 per cent sharp sand, 25 per cent black dirt, 25 per cent well rotted dairy manure. Every fifteen days giving them 10 pounds Ammo-Phos per thousand square feet. July 1st, and September 1st, then I used roller driven greens mowers cutting ⅜ inch high, and we raised our mowers to ½ inch late in the fall when the grass began to get down to the ground. Our turf and putting surface is perfect now at this season.

Beginning March 1st or just as soon as the frost is out of the ground I am going to begin with five pounds Ammo-Phos per 1000 square feet and three pounds every thirty days thereafter, following always with our old schedule of top dressings. In applying Ammo-Phos we find it best to dissolve enough for one thousand feet in fifty gallons of water, spray it on with sprinkling cans then water it in well, and the results are wonderful.

However, this spring I am going to try an Erickson Hydraulic spray before the hot weather strikes us, as we think it will save us a great deal of money in time and labor. Our club believes that we have the best greens in the middle west of their age. Would like to give you complete history of their construction in detail but space will not permit at this time.

Our worst enemy is brown patch in the Dollar form. I always catch it when it first appears and have had very little trouble mastering it with Uspulun. Last fall was a very bad fall for brown patch in Kansas and we greenkeepers who had Columbia bent had to almost sleep with our greens.

Full Co-Operation of Crestview Officials

I want to add in closing that our green chairman for twenty-five and twenty-six spent his boyhood in caddying and is a practical man. He surely has been of great help to me and to the club. He should be in the game along with us. Our club has made no mistake in selecting him as their President. Frank Coleman is always ready to aid us financially or any other way when he thinks one of our greens is going wrong. We cannot say too much in his praise. He is always with the greenkeeper.

Champions Demand Good Golf Turf

By EMIL F. LOEFFLER

Greenkeeper, Oakmont Country Club, Oakmont, Penna.

Emil F. Loeffler

FOR a period approaching fifteen years, I have been associated with the Oakmont Country Club and during the first season our putting greens were not in a very healthy condition. The greens had very little top soil, so that the growth was thin and during the hot weather, the greens were difficult to keep from burning out on account of not being able to retain the necessary moisture.

Building Up the Surface

I believe our top soil, at that time, was not more than one inch, while today we have more than four inches, brought up gradually by this process of top dressing. I believe this has been the most important feature in building up our putting greens to their present high standard. Top dressing is a very important detail of maintenance because of its nourishment to plant life, and its application produces true putting surfaces by smoothing out depressions. Greenkeepers should not hesitate in using compost, providing it is well decomposed and free from weeds, as the plant food it provides is natural and cannot be obtained in an artificial fertilizer.

Don't Force Greens Too Much

For the past several years we have used only compost and sulphate of ammonia on the putting greens. Sulphate of ammonia is quick in action and care should be taken in its use. The idea of fertilizing every two weeks is, in my opinion, wrong. Too much application produces coarse grass and slows up the putting greens, a condition which the majority of golf players dislike. A greenkeeper should recognize when his greens need this stimulant. At Oakmont we use eight to ten pounds per green and use three applications a year. Sulphate is valuable for several reasons. It causes an acidity of soil which is necessary to the growing of fine grass; valuable as a fertilizer, it also discourages the growth of weeds and acts as a deterrent to worms.

Fairways Fertilized Regularly

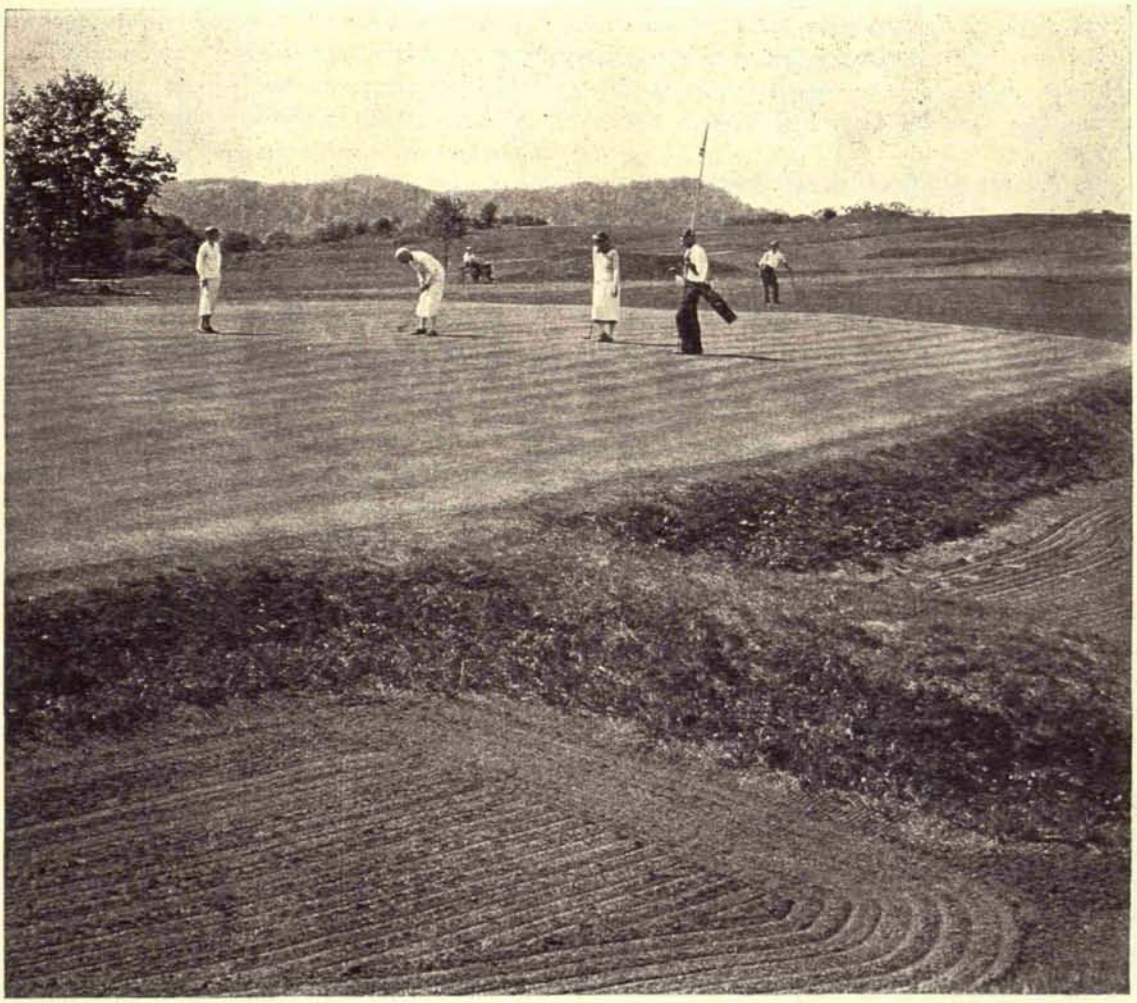
The condition of the Oakmont course for the last several years has been such that it requires very little preparation to stage a championship. This is because of constant superintendence and the fact that most of the holes are provided with two or more tees—which require almost as much attention as putting greens. Markers and cups should be changed daily.

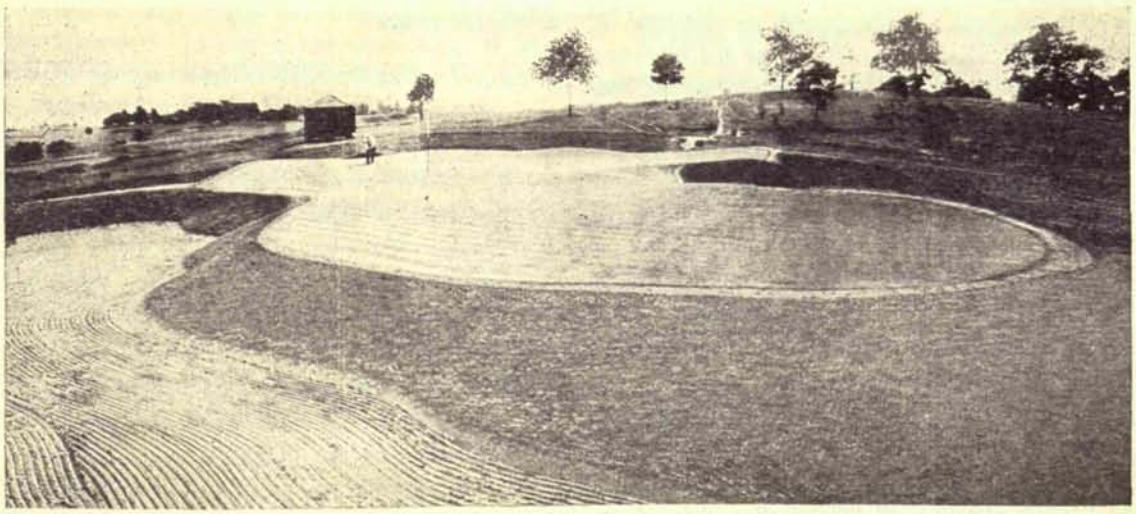
The Oakmont fairways are fertilized in the spring and again in the fall with a mixture of bone meal and sulphate of ammonia, three hundred pounds and two hundred pounds respectively, to an acre.

During the last ten years we have practically remodeled most of the putting greens in keeping with modern conditions. I shall be glad to set forth a few of these changes in a later article.

Chipping onto the Eighteenth at Oakmont

Oakmont Is Noted For Its Greens





Top, Number 14 Green at Oakmont Country Club, Oakmont, Pennsylvania, showing well raked bunker in foreground Below, Number 13 Green on the line of play. Note the carefully kept edge and rolling contour

Some "Rough" Talk

THE ideal rough is one that gives a fairly difficult lie, and also makes it possible to find balls easily.

In building a course great care should be taken that no fertilizer is put into that part which is going to be rough. The area intended for rough should be plowed and disced and then sown lightly with Sheep's Fescue.

Native Grasses Often Most Satisfactory

In many sections of the country the land used for golf courses is covered with a natural grass which makes an almost ideal rough. This grass is in form and substance a fescue in the fact that it grows in bunches, does not grow high, produces conditions that make finding a ball easy and gives anything but a good lie. This grass is known as Buffalo grass, poor man's grass, and may have other local names. In every case where a golf course is to be built on land that is covered with this grass, care should be taken not to disturb the ground which is to be used as rough. Of course this applies to ground covered with this grass which is free from brush and trees and can be left practically as it is.

The rough should be cut regularly and at the proper intervals, depending on the season, and the amount of growth. The height at which the rough is cut should be very carefully watched so as to give a difficult lie, and still make it possible to easily find balls. The length of the rough will vary, depending on the thickness of the growth. If the rough is very thick it can be cut much shorter than where it is thin. This means that in the spring and fall the rough should be cut closer than in the summer.

Growth Should Not Be Too Thick

Very often the most troublesome piece of rough that has to be contended with is a strip on the edge of the fairway that has been really a part of the fairway, and because of careless cutting, or by intention, has been allowed to become rough. These strips being right next to the fairways are the ones that cause a large amount of the trouble as regards lost balls. These strips of rough should either be included in the cutting of the fairways, or, if it is important that they be left as rough, then they should be treated as follows: The turf should be taken off and used elsewhere; the rich soil taken off and used in compost heaps and the exposed ground should be disced and planted with Sheep's Fescue.

If the rough is all very thick and hard to handle, it is wise to thoroughly disc the entire area. If this is done during a dry spell a sufficient number of plants will be eliminated to thin the growth so that it is proper for rough.

Remove Unfair Lies

In order to intelligently handle the rough it is necessary that someone carefully watch to see where the greatest percentage of bad shots go on each hole. In this way, the particular parts of the rough that need special attention will be indicated and should be carefully marked out with indicating stakes of some kind that will be out of sight but of a permanent nature. The cutting unit used on the rough will depend a good deal on the nature of the rough to be cut. If the ground is very rough and full of roots and stones it is wise to use an old fashioned horse drawn mowing machine. If the condition is good then a side bar cutter on a tractor, or a three gang mower with the knives set very high can be used.

Keep Weeds Down

Mowing the rough while weeds are in bloom will do much to eradicate annual and biennial weed growths, while perennial weeds are probably best dealt with by continual cutting of their tops or by grubbing out entirely. This method will also do much to prevent the spread of weed seeds to the fairways either by wind or surface water. If the soil of the rough is not of too light a nature and the growth of the grass is fairly thick, the growth of weeds may be checked to a large extent by burning over the ground of the rough in the fall.

White Sulphur Subscribes for Greenkeeper

In common with a number of other clubs, the Greenbrier Golf Club at White Sulphur Springs, West Virginia, has subscribed to THE NATIONAL GREENKEEPER for the greenkeeper, Mr. Kirkpatrick. Mr. Tait's letter follows:

The GREENBRIER and COTTAGES
White Sulphur Springs
West Virginia

National Association of Greenkeepers of America
407 Caxton Building
Cleveland, Ohio
Gentlemen:

Please be good enough to enter the subscription of our Greenkeeper, Mr. J. R. Kirkpatrick, Box 114, White Sulphur Springs, W. Va., for a year's subscription to the Greenkeeper, sending bill for same to White Sulphur Springs, Inc., in my care.

Yours very truly,
Harry Tait
Manager

March 12, 1927

Month by Month With the Trees

By C. M. SCHERER
Principal of The Davey Institute of Tree Surgery, Kent, Ohio

Editor's note: Almost every greenkeeper has trees to take care of and loses a certain number every year. That's why we have enlisted the aid of Mr. Scherer, a nationally noted tree doctor, to tell us what happens to the trees through all seasons of the year. It's a precious work, saving trees, and we believe the greenkeepers of America will appreciate Mr. Scherer's contribution to our worthy cause.

"YOU know I never prune my trees. I let Nature do the pruning. That's what happens to the trees in the woods and they always seem to be in pretty good shape."

The above is the answer I received a short time ago when talking to an owner about pruning his trees. This owner has expressed an idea which is quite generally prevalent about pruning trees. Pruning is such a common operation and has been practiced for so many years that the old adage of "familiarity breeds contempt" applies most admirably in this case. Many people believe that pruning is not an exacting operation and it can be done by anyone or not at all, as suits the convenience and pleasure of the one in authority.

In spite of this general feeling, it is nevertheless true that, conservatively speaking, 75 per cent of the decayed areas in the trunks and larger branches of trees result from either improper pruning in the first place, or improper care of the pruning wounds after the branches have been removed.

Pruning can be defined as the proper removal of dead, diseased and superfluous branches. It is quite evident that dead and diseased branches are a decided menace to the health and vigor of any tree.

Superfluous branches are those which interfere with the proper development of the tree or they may be those which interfere with activities which may go on in the neighborhood of the tree. In some cases, superfluous branches may interfere with the beauty of the tree, and in all cases the proper removal of the interfering branches is necessitated for the satisfaction of those concerned.

When you speak to the person who allows Nature to take care of his trees about removing the dead branches, the usual answer is: "They will soon fall off anyway. So why expend the energy and money required to take them off?" It is true that these branches will fall off, but too often results are disastrous and this is equally true of the diseased branches.

Dead and Diseased Limbs Menace to Life

One needs only to read the papers carefully for reports of fatal accidents caused by falling branches. The citing of one specific instance will illustrate what often happens. This particular accident occurred July 4, 1921. A business man from one of our moderately large cities took his family for an automobile ride and a picnic lunch in a park some twenty miles distant from his home. The lunch was spread on one of the tables supplied by the owners of the park and the family were enjoying their meal when a diseased branch crashed down some sixty feet from one of the neighboring trees. The branch struck the business man, breaking his neck and of course instant death occurred. His wife became a widow and his children fatherless because of the breaking off of this branch. Although this may seem to be an unusual case, it can be duplicated many times in the course of a year.

Broken Branches Spread Rot Into Trunk

Not only are falling branches a menace to the life and limb of people who may be in the vicinity of the tree when the branch gives way, but they are also decidedly detrimental to the health and physical strength of the tree itself. When a dead branch breaks, you will usually find that the break occurs about a foot or so from the point of attachment of the branch to the trunk. This leaves a dead stub on the tree. The weight of the stub is not sufficient to cause it to break again, neither will the weight of ice or snow or the force of the wind exert enough pressure on it to cause it to break again. Consequently, the only way the stub is removed is by rotting away. This may take several years. In the meantime it is impossible for the wound to heal and the decay extends from the stub on into the parent stem or trunk and a beginning is made which will end in the destruction

1. Before pruning a low hanging branch which obscures a fine view. See Cut No. 2

2. After removing thick leaf growth, a beautiful vista appears. See Cut No. 1