

The A B C of Turf Culture

Composition and Properties of Individual Fertilizer Materials

By O. J. NOER

THE functions of the individual plant food elements and general characteristics of the larger groups of fertilizer materials were discussed last month. The individual materials vary in their plant food content, the rate at which the plant food is made available, and in their secondary effects upon the soil. The more important characteristics of the principal materials deserve consideration because a knowledge of these properties must serve as a guide in the choice of fertilizers for greens and fairways.

Organic Nitrogenous Materials

MANURE—While barnyard manure varies greatly in composition, good manure has the following average composition:

	Percent	Pounds per ton
Nitrogen .....	.5	10
Phosphoric Acid .. .	.3	6
Potash .....	.6	12
Water	72.0	
Ash	8.3	
Organic Matter	19.7	394

About one-half of the nitrogen and three-quarters of the potash are water soluble. Manure contains about 4.5 percent of lime, which is equivalent to about twenty pounds of lime carbonate per ton.

During composting the non-nitrogenous organic matter (straw, etc.) breaks down, and the availability of the plant food elements is increased. There are some losses of nitrogen, but these can be largely prevented by keeping the pile compact and moist. Composting improves the mechanical condition of the manure due to the decomposition of the straw and kills the weed and clover seeds voided by the animal.

So far as plant food is concerned it is often possible to supply these more cheaply from other materials. One of the chief benefits of manure results from the beneficial effect of the organic portion on the physical condition of the soil, and is best secured when the manure can be incorporated with the soil. This is not possible on established fairways.

While manure does not contain large amounts of plant food, applications are usually heavy so that the total



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.

amounts of plant food applied may be considerable. A ten-ton application furnishes about 100 pounds nitrogen, 60 pounds phosphoric acid and 120 pounds potash. Poor results from substituted materials are often due to failure to apply sufficient quantities of plant food.

MUSHROOM SOIL—This material is the spent soil from the mushroom beds. Originally it consisted of a mixture of 7-12 parts manure and 1 part soil. The heat developed in the benches results in loss of moisture so the final product usually contains from 35 to 50 percent moisture. The amount of plant food varies considerably depending on the ratio of manure to soil originally used, the extent of decomposition and the moisture content. Samples obtained from the Philmont Club at Philadelphia contained the following percentages of plant food:

	No. 1		No. 2	
	Percent	Pounds per ton	Percent	Pounds per ton
Nitrogen .....	.80	16	1.32	26.4
Water soluble nitrogen ..	.08	1.6	.29	5.8
Total phosphoric acid ..	.56	11.2	.61	12.2
Total Potash .....	.81	16.2	.97	19.4
Ash	43.66	...	25.58	...
Moisture	37.98	...	50.04	...
Organic Matter	18.36	367.0	24.38	497.0

Sample number two looked like the better material which is borne out by the chemical analysis. The original mixture evidently contained much less soil per ton of manure than in the case of sample number one.

While mushroom soil contains larger total amounts of plant food per ton than good barnyard manure the proportion of water soluble nitrogen is less. The chief value of mushroom soil is as a source of organic matter, yet the results show that each ton contains about the same amount as good manure.

There is danger of introducing weeds. Mushroom growers are finding it difficult to obtain abundant supplies of manure. Consequently the proportion of manure used in the benches is less than was formerly employed. Sufficient heat does not develop during fermentation to kill all weed seeds.

Considering all items of cost, plant food can be supplied usually cheaper from other materials, and the use

of mushroom soil should be confined to situations where the organic matter is needed and cannot be obtained cheaper from other sources.

POULTRY MANURE—Dried poultry manure can be procured from a number of manufacturers. The following plant food content is guaranteed.

	Percent	Pounds per ton
Nitrogen	4.9	98
Phosphoric Acid	2.5	50
Potash	1.3	26

The nitrogen is in a form which is quickly converted into available forms. Due to the rapid decomposition, burning of the turf may occur if too heavy applications are made.

SHEEP MANURE—While large amounts of dried sheep manure are sold for use on lawns, it is not extensively used on golf courses, probably due in part to the high cost per ton. The guaranteed composition is as follows:

	Percent	Pounds per ton
Nitrogen	2.00	40
Phosphoric Acid	1.25	25
Potash	2.00	40

DRIED BLOOD—There are two kinds on the market, namely red and black blood. They are obtained by drying blood carefully by super-heated steam and hot air. The black blood results from charring due to too high temperatures. Red blood contains about 13.5 percent nitrogen, while the black blood is a more variable product containing about twelve percent nitrogen. Dried blood contains traces of phosphoric acid.

Blood decomposes very rapidly in the soil and is a source of quickly available nitrogen. It must be used carefully because it will burn the turf.

The limited supply is in great demand for use as a cattle food and blood is consequently an expensive source of plant food nitrogen. For this reason it will never be extensively used on golf courses.

COTTONSEED MEAL—The composition of cottonseed meal varies greatly. Where it is not adulterated with hulls the variation in composition may be due to the season, nature of the soil or the climate. Cottonseed meal is in great demand for feed for live stock and the bright yellow meals are used for this purpose. The darker meals are usually sold for fertilizers. The dark color may be due to over-cooking, to fermentation or storing in a damp or wet place. If there is no loss of nitrogen, the product is not injured for fertilizing use. Cottonseed meal has about the following average composition:

	Percent	Pounds per ton
Nitrogen	6.2	124
Phosphoric Acid	2.5	50
Potash	1.5	30

Very often the nitrogen content is not given on the sales tag, but the protein content instead. The nitrogen

content can be obtained by dividing this figure by 6.25. Thus a 43 percent protein meal is equivalent to 6.8 percent nitrogen.

Cottonseed meal is an excellent source of nitrogen for fairways and greens to supply the more slowly available nitrogen. It provides for a long continuous feeding. Due to its demand as a live stock feed it is often high priced, and other equally good materials can usually be obtained at lower cost.

TANKAGE—Tankage is the refuse from slaughter houses and consists of meat, blood, bone, etc. Animals condemned as unsuitable for food are made into tankage. The nitrogen is derived primarily from meat and blood. When the percentage of bone is large the phosphoric acid is high and nitrogen low, and when there is an excess of blood and meat the nitrogen is high and the phosphoric acid low.

There are a number of grades on the market containing about 6.5, 7.5 and 8.0 percent nitrogen. The phosphoric acid content varies from 3 to 6 percent.

Concentrated tankage is another grade and the richest of all. It contains more nitrogen and is a very uniform product. It is made by evaporating wastes which contain animal matter in solution. It contains 10 to 12 percent nitrogen and small amounts of phosphoric acid.

The tankages are usually high priced because of the demand for use as cattle feeds.

In the soil the nitrogen is quickly converted into forms which the plant can use. There is danger of burning the turf if heavy applications are used. The continued use of tankages high in phosphoric acid tends to encourage clover.

SEWAGE SLUDGES—There are two types of sludges produced in sewage treatment plants, depending upon the method of purification. Most plants use the older Imhoff tank processes, and only one plant located at Milwaukee, uses the new activated sludge process. In the Imhoff tank process air is excluded so as to promote liquefaction of the organic matter contained in the sewage. This results in loss of the most quickly available nitrogen. The resulting sludge is partially dried on sand beds, and has the following approximate composition:

	Percent	Pounds per ton
Nitrogen .....	.70	14.0
Phosphoric Acid .....	.33	6.6
Potash .....	.24	4.8

These sludges are of low value, and in poor physical condition. When used they should be thoroughly composted to improve mechanical condition and render the nitrogen available.

Activated sludge is a product produced by the activated sludge method of sewage treatment. In this proc-

ess air is constantly passed through the sewage. The so-called activated sludge which settles out is filtered and dried. A product of uniform chemical composition and physical condition is produced which is free of weed seeds and harmful bacteria. The only marketable product is produced by the Sewerage Commission of the City of Milwaukee and is sold under the trade name Milorganite. It has the following average composition:

	Percent	Pounds per ton
Nitrogen	5.4	108
Phosphoric Acid	2.5	50
Potash .....	.3	6

The nitrogen is in organic form, and when applied to the soil the nitrogen is gradually released in available forms. It is slow acting but provides for long feeding, and can be used with practically no danger of burning the turf.

TOBACCO DUST—A number of greenkeepers use tobacco dust regularly. This material has the following average composition:

	Percent	Pounds per ton
Nitrogen	1.8	36
Phosphoric Acid .....	.6	12
Potash	2.9	58

The potash content may be as high as 6 to 8 percent, and the nitrogen content occasionally runs as high as 4 percent.

RAW BONE MEAL—This product is derived from raw bones, which contain considerable organic matter much of which is in the form of fats. The fatty constituents tend to decompose slowly and make the nitrogen slowly available.

Raw bone contains about 3.5 percent nitrogen and 22 percent phosphoric acid. It also contains from 4 to 8 percent of lime carbonate.

At present market prices plant food can be obtained better from other materials at lower cost. Furthermore the proportion of phosphate to nitrogen is too high. When sufficiently large applications are made to supply needed nitrogen much more phosphate than is needed by the turf is added to the soil. This together with the lime carbonate tends to encourage clover.

STEAMED BONE MEAL—Raw bone is steamed to remove the fat which is used to make soap. The resulting steamed bone contains about 2.25 percent nitrogen and 25 to 27 percent phosphoric acid. The plant food is more quickly available than in raw bone because of the removal of the fat, yet even steamed bone meal is a slow acting material. The same objections apply to its use as raw bone meal.

UREA—This is a new product produced in Germany. It is a synthetic nitrogen product and contains 45 percent nitrogen. Urea is water soluble, and will burn the turf if too heavy applications are made. It is quick acting resembling sulphate of ammonia in this respect. The

nitrogen costs more per pound than in sulphate of ammonia due to the imposition of an import duty. The manufacturers claim that Urea has little effect on soil reaction.

Ammonia Containing Nitrogenous Fertilizers

AMMONIUM SULPHATE—This is the most widely used nitrogenous fertilizer on golf courses. It is produced as a by-product at coke ovens. Each ton of coking coal yields about twenty pounds of ammonia. The final product contains twenty-five percent ammonium which is equivalent to twenty percent nitrogen.

It is water soluble and quick acting. When applied to the soil the ammonia is held temporarily by the fine soil particles in the shallow surface soil layer. This may be the reason why equal amounts of nitrogen from sulphate of ammonia prove more effective than from nitrate of soda on bent grasses which have such a shallow root system.

Sulphate of ammonia makes the soil acid, although repeated applications are often required to effect considerable change, particularly on heavy soils. The increased acidity is produced in two stages. The sulphate combines with the calcium of the soil and leaches out in the drainage waters. The ammonia, which is temporarily held by the clay particles is gradually converted to nitric acid by groups of soil bacteria. This nitric acid combines with more calcium and may be taken up by the plant or leached out of the soil.

The repeated use of sulphate of ammonia tends to decrease and eliminate clover and weeds, probably due to the increased acidity of the soil.

If an acid soil is desired sand and soil used in top-dressing mixtures should be tested for lime carbonate. Frequently they contain sufficient lime carbonate to more than counteract the acid producing properties of the sulphate of ammonia.

AMMO-PHOS—This is a water soluble material containing twenty percent ammonia, equivalent to 16.4 percent nitrogen and twenty percent phosphoric acid. It is very similar to sulphate of ammonia in its action, being quickly available and liable to burn the turf if too heavy applications are made.

Ammo-Phos also tends to make the soil more acid but is probably less effective than sulphate of ammonia. In an acid soil the phosphoric acid tends to unite with iron rather than calcium and thus has little effect in removing lime.

Unless the turf requires additional phosphoric acid there is little advantage in using ammo-phos rather than

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John Morley

A Chat With Our President

WE read in the Literary Digest—"Time is one thing in our lives shared by men and women alike—by rich and poor, young and old. No one can rob us of time. It is up to us whether we make good use of it, or kill it. Using time intelligently means filling our lives with companionship in the deeds of great people, with a warm sympathy for the moving world about us, with the intelligent alert action that comes from linking our own efforts with those of others." This is one of our aims and objects and our association will be greatly enriched by its membership observing the value of Friendship and Time.

THE Walker Cup Match will be played at The Chicago Golf Club, Wheaton, Illinois next August. Our Vice-President, John MacGregor, has charge of this course. If John has conditions similar to what I saw on my recent visit at Chicago he will receive lots of favorable publicity.

WHAT gets a greenkeeper's goat is to have a number of visitors tell him his putting greens are fine and immediately after to have some of the members tell him they are not.

FRED Ingwerson of Bunker Hill, in the Chicago district, has such a dense bent turf on his putting greens that he cannot get any compost worked into it.

HELP us to keep our association clean and pure, so that no one can point a finger of scorn against it.

WILLIAM Bally of the Salem Country Club recently took upon himself a wife. Bill, the boys wish you and yours every success.

START a nursery now—sow German bent seed and enough for one or more putting greens. Remember it takes from two to three years to produce good turf from seeds. It may be that in two years your club may decide to move a putting green farther back—in this event you will not need to move the old green, which will furnish a good approach.

OUR association should be the outgrowth of the spirit and the prevailing sentiments of the times.

E. E. SNYDER of Congress Lake Country Club, Akron, Ohio is a member of his club. Here is a case where the greenkeeper and the members can meet on equal terms.

THE progress and the welfare of the world depend on men that choose the path, rough, slow and tiresome that leads to something real.

RALPH MARTIN of the Shanopin Country Club, Bon Avon Heights, Pennsylvania, missed the August 29th meeting in Washington by a mistake in the date, but as a rule Ralph doesn't miss much when something good is going on.

WE live in a day in which human beings and especially the young take a light view of life. They hurry through, want to get by if they lack ambition—or if they have what they call ambition, it is not the ambition to accomplish, but the ambition to be known.

DAVID BELL of Saint Clair Country Club, Bridgeville, Pennsylvania, is very interested in vegetative putting greens, and is very successful with them.

FOR the sake of your family become a member of the Death Benefit Fund.

FRED KRUGER of Olympia Fields Country Club, Matteson, Illinois, has been very busy with tournaments the past season. September found him with the Western open on his hands—but Fred is equal to these occasions.

A NUMBER of greenkeepers that escaped the brown-patch this season found another pest to deal with—crab grass.

CHARLIE ERICKSON of Minekahda County Club, Minneapolis, Minnesota, became very popular with those that played over his beautiful course during the National Amateur Tournament.

TO amount to something you must do something, create something.

EMILE LOEFFLER of the Oakmont Country Club, Oakmont, Pennsylvania, has nothing to do now since
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The Wanderings of a Greenkeeper

By GEORGE ROBB
Hillcrest Country Club, Kansas City, Mo.

JOHN MCNAMARA, of the Pittsburgh Field Club, struck a responsive note in his article in the February issue, in which he states that, had he his life to live over again, he would distribute his experience over a number of courses. I am firmly in accord with him, my viewpoint being borne out by my actual experience over a number of courses from the New England coast to the Middle West.

The Sandy Soil of Connecticut

In my first experience as greenkeeper at the Hartford Country Club, Connecticut, I had to do with a sandy loam soil, and plenty of it, with a good sub-soil which provided excellent drainage—a great advantage to any greenkeeper. We also had a good sand bank, which we used in the sand boxes, and adequate loam on the course with which to make our own compost.

Heavy Clay At Cincinnati

At the Cincinnati Country Club, Cincinnati, Ohio, I encountered a great difference in both climate and soil—in fact, conditions were just the reverse. The soil was a heavy clay, with not more than two inches of loam on the fairways—in some stretches, none at all. In July and August it became so dry that cracks formed in the ground large enough to admit one's hand to the wrist. In order to prevent a lot of balls from sinking that were never intended as putts, we had to fill up these miniature canyons with loam. Securing the latter was no easy task, and necessitated a country-wide search. The minimum price was four dollars a load.

Doubtless a great many greenkeepers, in reading this, will wonder at the amount of detail. This detail is included only to illustrate the great difference in the cost of maintaining different courses. The one that, like the

first, is fortunate in possessing so many natural advantages is bound to cost less to keep than the contrasting example which was so bare that everything had to be brought in.

Natural Springs in Westchester County

My next experience was at the Quaker Ridge Golf Club, Mamaroneck, Westchester County, New York, where I found a clay soil, but with more loam on the top than at the Cincinnati Country Club. The soil was very wet, with quite a number of natural springs. I put in over three thousand yards of drainage on this course. The greens were very poor and uneven. I procured one hundred and fifty tons of mushroom soil and rubbed it through a one-fourth inch screen. Once a week, all through the summer, I would put one-half a yard on each green, and by the month of August we had very nice smooth greens. Quaker Ridge, by the way, is the home of Johnny Farrell, one of our young champions.

Starting Bent Greens at Akron

From here I returned to Ohio—the Fairlawn Heights Club, at Akron, where the soil is a very heavy clay loam mixture, which I discovered to be a good grass grower if kept well manured. There were nine holes when I went there—of blue grass, red top and clover mixture. On

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George Robb



Front view of clubhouse at Hillcrest, Kansas City



Ninth green at Hillcrest with north end of clubhouse in background

From The Viewpoint Of Local Associations

What District Associations of Greenkeepers are Doing

Mid-West Greenkeepers Association

September 6th, Ridgewood Country Club

THE minutes of the last meeting were read and approved.

The question of Demonstration Day was put before the committee and it was decided to hold it next spring.



(Photograph received from George A. Davis, Inc., Chicago)

C. A. Mills and his gang at Tam O'Shanter Country Club, Chicago, where the Mid-West Association held their greenkeeper's tournament on Sept. 26.

After a trip around the course, the members attended luncheon served by the club.

The course was very dry throughout the fairway due to the long dry spells this season. Otherwise, the course was in excellent shape.

The question of the greenkeepers' tournament was put before the committee and it was decided to hold same September 26 at Tam O'Shanter Country Club. There will be some valuable prizes donated by the manufacturers and various seed houses of the district.

The meeting then was adjourned and a trip to Twin Orchards Country Club was made. A number of the greenkeepers decided that the greens on this course were as fine as any in the district.

Respectfully submitted
Edward B. Dearie, Jr., Sec.

Cleveland Dist. Assoc. of Greenkeepers,

(Annual Meeting), October 10

THE annual gathering at Westwood Country Club on October 10 was a lively one, filled with discussions of fertilization, brown-patch, *Poa annua* and other subjects of interest.

At eleven o'clock the group started on an inspection of the Westwood course, which is one of great natural beauty. The turf has been consistently good all summer, and the growth on some of the bent greens so thick that rubbing in compost is an impossibility. Mr. Fred Burkhardt, in charge of the course, advised the members that

he has used compost only twice this season, early in the spring and again about October first.

Luncheon was served to twenty-eight at one o'clock, and the regular meeting was held immediately thereafter. President John Morley opened the meeting with a short talk covering the history of the local association, and the possibilities of the future. He recalled the first organization meeting which was held at Westwood Club four years ago, during the time that Mr. Robert E. Power served as chairman of the Westwood Green Committee, and expressed his appreciation of the loyal support Mr. Power has given the Cleveland district greenkeepers and the National Association. In concluding, Mr. Morley urged that a committee of five be appointed by the new officers to serve in an advisory capacity free of charge upon any call for assistance received from a district club.

Mr. Morley then introduced Mr. Lyman Carrier, the speaker of the afternoon, who responded with a comprehensive talk on the fertilization of golf turf. From his many years of experience as an agronomist in the Department of Agriculture, and his work in connection with the U. S. G. A. Green Section, Mr. Carrier brought to this meeting a fund of knowledge which drew many questions at the close of his talk. He expressed the opinion that too frequent top dressings containing partially decayed organic matter are largely responsible for the onslaught of brown-patch.

After a somewhat lengthy discussion, it was found to be the concensus of opinion among those present that sulphate of ammonia and bi-chloride of mercury should not be applied at the same time to golf greens. This subject was taken up at one of the early spring meetings this year, and members have been paying particular attention to the reaction of these two chemicals on putting greens, when applied in mixture. It was agreed that

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Some of the members of the Cleveland District Association of Greenkeepers snapped at Westwood Club, Oct. 10.

The Truth About Greenkeeping

By L. J. FESER, Greenkeeper
Club, Wayzata, Minnesota

THE term "greenkeeping" is not among the 83,000 words that appear in my 1924 Desk Standard Dictionary. "Greenkeeper" is also lacking. "Green," according to that book, is the ordinary color of growing plants, and is also used to express something that has not arrived at perfection, is unripe or immature. It is also given as "of recent occurrence; new; fresh" and "characterized by youthful vigor; flourishing." It is used to designate a "plot of grass land."

Among the men familiar with the term "greenkeeping," the word "green" means the "plot of grass land" and the golfing population use the term to designate that area of ground on which they find "the soul of golf." It is a great word. As I look out of my office window across the country side, green is the predominating color. Nature is the Great Greenkeeper. To be a greenkeeper, as we know the term, we must be first hand students of the Great Greenkeeper.

The call that the Great Greenkeeper has made has been heard by millions. It has penetrated the office walls where thousands earn their daily bread; it has been heard above the roaring and clanging in the big industrial shops; it comes softly to the ears of professional men and women as they bend over their books, papers, or patients; children everywhere have heard the call, and men working in the depths of the ground look forward to the time when they may heed the call.

Greenkeepers, as they are known, are agents of the Great Greenkeeper. In a small way they prepare tracts of Mother Nature's garden for the golfing multitude, and then it is their premier duty to keep such tracts in proper condition for that game of games, golf.

Love of Nature First Requisite

What is the necessary characteristic of the man who elects himself to the job of greenkeeping? Perhaps it is industry, or intelligence. It might be patience, persistence, honesty, ability to study, or mechanical ability. It is all of these. But the essential characteristic is love of Nature. He may have all the other essentials, but he will fail before he has begun if he cannot love the beauty and perplexities of the Great Greenkeeper. He can never hope to be a master of Nature but he must love her and constantly seek her knowledge.

What must the man know to be a greenkeeper? If he loves Nature in all her moods, he understands that many of her moods are unfavorable to his work. Nature provides means of existence for all living things, and in so

doing she must not select a golf course for living things pertaining only to the joy of the greenkeeper and the golfer. A greenkeeper must be constantly prepared to cope with her unfavorable moods. He must encourage the desirable and discourage the undesirable. He must know how to make the best of either favorable or unfavorable conditions.

Knowledge of Climate and Soil

Knowledge of the climatic conditions in the region in which the greenkeeper is employed is imperative to his success. High and low temperatures, humidity, rainfall and winds modify his work. The duration of the seasons calls for careful planning while sudden storms, hot winds and open winters must be considered as uncertain factors.

Soils differ largely in the same locality. The greenkeeper must know how to treat a sticky, baking soil as well as a loose, sandy loam or light peat. Fertility must be considered at all times, and the chemical condition of the soil must be modified by his expert care in hundreds of instances.

Fertilization a Constant Study

More than fifty kinds of fertilizers and soil conditioners are offered to the greenkeeper by one company. Hundreds of various kinds of fertilizers are on the market, and the selection of a fertilizer is an item of golf maintenance that must be carefully considered. Elements desired, availability, duration, chemical reaction, ease in handling, odor and cost are some of the points a greenkeeper should consider. Compost top-dressing or liquid application of fertilizer are both good. When should one be applied, and when is the other superior? How much of any fertilizer should be applied?

Growing Grasses Suited to Locality

To choose a strain of bent today is as easy as choosing a make of automobile. But there is a best strain for every locality. What is it? It is reasonable to suppose that a strain of bent found very satisfactory in Minnesota might be superior to all others in California? Bent is but one type of grass. There is a place on most golf courses for the fescues, poa grasses, rye grasses and legumes. Quack grass is common in the roughs of the northwest, and Bermuda is foreign language to the native sons of Wisconsin or Vermont. The green-

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Plans For Greenkeepers' Annual

PLANS to make the second annual convention of the National Association of Greenkeepers of America the greatest golf gathering ever held are progressing rapidly. The convention will be held at the Fort Shelby Hotel in Detroit, February 23, 24 and 25, 1928.

"Inasmuch as the chief purpose of this association is educational," said John Morley in a recent interview, "we propose to devote most of our time to a thorough discussion of the problems of greenkeeping. Already we have experts in the various lines of turf culture preparing papers which will be read and discussed during the three-day meeting.

"Some of the subjects we have in mind are—Construction of Putting Greens; Golf Course Drainage; Control of Grubs and Earth worms; Control of Brown-Patch; Canada Maintenance Problems; Soil Structure and Texture; Fertilization of Greens and Fairways; Fairway Irrigation; Relations of Professional and Greenkeeper; Perennial Plants and Shrubbery; Golf Course Trees.

"Detroit is centrally located and ideal as a site for the convention. It is only an overnight run from the far eastern cities as well as the middle west and is most convenient to all points in eastern and central Canada. In fact our Canadian members have already assured us of a very large attendance. The Fort Shelby Hotel with its new 1000-room addition offers unexcelled accommodation and we are assured of most reasonable rates for the greenkeepers.



Greenkeepers numbering 150 at the August Convention in Washington. The majority of the convention of the National Association of Greenkeepers.

Convention Progressing Rapidly

"The directors of the association have been approached by many of the manufacturers who would like to exhibit their products at Detroit in connection with the greenkeepers' convention. This is in line with the decision made by the executive committee last summer to consider a Golf Show in connection with the annual meeting. But if a Golf Show is held it will be controlled and operated by the association and not by any individual or group of promoters. The expenses to the exhibitors will be as small as possible and only those products which rightfully belong in a Golf Show and which pertain to golf course construction, maintenance and use, will be permitted in the exhibition hall."

Mr. Morley states that an expression from greenkeepers and golf club officials who read the NATIONAL GREENKEEPER would be welcomed by the directors as to whether or not a Golf Show should be held in connection with the annual convention. Will it add to or detract from the interest and attendance of greenkeepers and others who have to do with golf course work?

Make your plans now to pack your bag on Washington's Birthday and head straight for Detroit where hundreds of your fellow greenkeepers will gather for this annual affair.



Those pictured above have already signified their intentions to be present at the coming annual convention of the National Association of Greenkeepers of America in Detroit, Feb. 23, 24, 25.

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keeper must know the habits of the grasses that grow in his locality, and he must know them well.

To Seed, Sod or Stolonize?

Seeding is the common way to start grass growing. Stolonizing and sodding are other ways. When is the best time to seed? How much seed should be used? Is it clean seed and will it germinate well? How should it be planted? When should one stolonize? How is the material? Will it grow, or how much will grow? How should the stolons be applied? How do you handle sod? How thick do you cut it? Do you roll it much? How much does it cost to sod an area like that? Those are a few of the questions that every greenkeeper has been asked. Can an attorney at law answer as many questions in his line in as short a time as a greenkeeper must and will answer the questions above?

Mowing and Watering

Mowing is the job that takes more of the maintenance allowance than any other phase of golf course work. Watering is the job that calls for exact knowledge. When should mowing and watering be done? How long should grass be cut? When should greens, tees, borders and fairways be cut? When should watering be done, and how much should be applied? How do rain storms affect the greenkeepers plan of watering? How can excess water be taken from greens, fairways and traps? The good professional greenkeeper does not guess the answer to these questions, he knows.

Selecting Efficient Equipment

Some wise man made the statement that a golf club tool shop is one of the world's best concentration points for junk. Golf clubs have supplied a living to hundreds of men who are engaged in making equipment that is worth less than one-half of one per cent of its cost. One look at a tool shed is enough to know the professional efficiency of the greenkeeper in charge. He buys equipment that pays for itself. He is able to select a good mower, a good rake, a good tractor, a good team, a good harness, a good truck, a good plow, a good top dressing machine, a good flag, or any other article needed in the maintenance of a golf course. He must be a buyer; he must buy well and economically.

Maintaining Machinery in Repair

After having purchased a machine, the greenkeeper must care for it. He must understand how it functions, and how to get the most and best results with it. He must know oil from grease, he must know wear from breakage. He must have tools with which to repair any article that may break at a time when he needs it most. He must know how to use such tools. The member of a club who brings a guest from London or Tokio to play golf on Wednesday has little patience to listen to a break-

down story, even tho the breakdown was directly responsible for the long grass on the eighteenth green.

Necessary Control of Pests

Some of the friends of the greenkeeper look upon his job as one to be compared with that of the janitor of heaven. But a few words on pests will convince any skeptic that greenkeeping is not all sunshine and rosy clouds. Aside from unreasonable members and high pressure salesmen, he must combat brown patch, snow mold, worms, ants, beetles, gophers, mice, skunks, hornets, rats, rabbits, dandelions, chickweed, plantain, crabgrass, grubs and many more objects of irritation.

Training and Holding Good Workmen

After a survey of the job of keeping greens, one realizes that the best assistance a greenkeeper may have is a good crew of intelligent workmen. A workman on a golf course is as much of a tradesman as a carpenter or mason. To hire and keep such men is a big task, for golf maintenance men are usually paid on the same basis as common workmen. Fairness and personality on the greenkeeper's part are essential. He must make his men like him and like their work. In regard to his workmen, he is an employer rather than a foreman. Tact alone will carry him through many tight places in this respect.

Establishing a Greenkeeping Standard

My article touches on the job of greenkeeping. I could go on for many days and write of things that a greenkeeper ought to know. But I hope I have mentioned enough to convince anyone that a good greenkeeper is called upon to use gray matter as much as a lawyer, doctor, or dentist. Yet a greenkeeper is considered by most golfers as a workman on the grounds.

We are not considered professional men by most people. We are responsible for that condition. Any one who has charge of a golf course is a greenkeeper. Some are worthy of the name, others are not. Every professional man must meet a certain standard before he is admitted into the profession. We are admitted as soon as we get a job.

Let us raise our standards. Let us have a bar examination, so to speak, and give every greenkeeper the opportunity to pass that examination. Let such examination be approved by the Green Section of the U.S.G.A. That will give us a common standard. Let the examinations be regional, so that the test applies to Minnesota will be different than the test in Florida.

Lawyers passing the bar examination in New York are not conversant with the laws of South Dakota, but they have the same fundamental understanding of law. The same principle could apply in our profession.

Are we content to be greenkeepers as the word stands today, or shall we get busy and make the word "greenkeeping" mean something?