# The New Toro Power Putting Green Mower Has Many Unusual Features

The new Toro power putting green mower is the result of valuable ex-perience gained in building the present Toro hand putting green mower, which has made such a remarkable name for

been incorporated in this new mower.

Motor

The motor is an exceptionally well built one horse-power, four-cycle, air-



The new Toro is 191/4 inch cut, and full length rollers, both front and rear, prevent scalping on undulating ground.

itself on thousands of both American and foreign golf courses. The same basic principle of general design and operation, which has proven so suc-cessful in the present mower, has been incorporated in the new power mower.

Every effort has been made, however, to bring the mechanical specifications up to the highest level known to modern engineering practice, and the following specifications will give clear analysis of the many important features that have



The proven successful design of the Toro hand putting green mower has been closely followed in the new power mower. Note the horizontal application of the motor, which not only provides a neat, trim appearance with low center of gravity, but greatly increased efficiency due to les-sened vibration. There is no pounding of the turf in the new Toro.

The flexible feature, which has been the main advantage of hand mowers, is maintained in the new Toro power greens mower.

### Reel

cooled motor, and weighs only forty pounds. It has an en-closed fly-wheel so there is no clogging of the blowers. Ignition is of the high tension type, with a Bosch magneto, and carburetor is Tillotson automobile type, equipped with modern air cleaner. Oiling system is of self-circulating type and of ample capacity.

The motor is rigidly mounted in horizontal position, which greatly lessens the vibration and provides increased efficiency.

The starting crank is permanently mounted, with an automatic releasing spring, throwing it out the instant the motor starts. The crank is geared 2 to 1, which makes for easy starting.

Frame The frame is of malleable and steel construction, of light weight but great strength-rigid-insuring perfect alignment at all times. The gear case is made of aluminum-light, strong, oil-tight and dust proof.

> Gears Gears are machinecut, hardened steel gears, mounted on SKF ball bearings and Hyatt roller bearings. They are enclosed in an oil-tight alu minum housing. Throw - out lever is at-tached to the reel gear so that the reel can be disengaged.

The reel has eight blades assembled on five spiders, is 5 inches in diameter and cuts 19¼ inches in width. The blades are accurately formed from the finest quality chrome-vanadium steel. The reel shaft is mounted on SKF ball bearings, enclosed in dust proof cages.

### Bearings

Plain bearings have been en-tirely eliminated on the new Toro power putting green mower. All gears and driving parts, including the front wheels, are mounted on either ball or roller bearings. Alemite oiling system throughout.

### **Grass** Catcher

A light weight, all metal grass catcher, easily disconnected. Transport Truck

A power driven transport carrier is offered as optional equipment for carrying the mower from green to green.

### **One Standard Size**

The new Toro power putting green mower will be built in one size only—19½ inch cut. Careful investigation has shown that a larger size is detrimental to the average putting green, particularly on account of the increased weight and the danger of scalping on undulated greens.

The 19¼ inch size has sufficient capacity to cut the largest green quickly without danger of scalping or packing, and is to be preferred over greater width mowers that must be handled only with extreme care.

The Toro power greens mower is offered, not as an experiment but as a very careful development over as a very careful development over a period of years, and we can rec-ommend it very highly where a machine of this type is wanted. All the new additions and im-provements in the TORO line of these average de-

labor-saving equipment are de-scribed in the new TORO 1930 catalog. Write for your copy.

### TORO MANUFACTURING CO. 3042-3160 Snelling Ave. Minneapolis, Minn.

Service Stations in all the larger distribution centers.

JANUARY, 1930

Single Copies Twenty-Five Cents. Yearly Subscription to Members Two Dollars. Yearly Subscription to Non-Members Three Dollars.

VOLUME IV

No. I

# GREENKEEPER

The NATIONAL

(Registered U. S. Patent Office)

Official Organ of The National Association of Greenkeepers of America Published monthly at 405 Caxton Building, Cleveland, Ohlo. Contents copyright, 1928, by The National Greenkeeper, Inc., Publishers.

Robert E. Power, President and Editor; Frank H. Pelton, Sec'y.; C. F. Lowe, Treas.; M. J. Fox, Asst.-Sec'y. Herman Sonneborn, Eastern Representative, 152 W. 42nd St., New York City

Entered as second-class matter, Aug. 25, 1928, at the post office, Cleveland, Ohio, under act of March 3, 1879

All Rights Reserved-None of the contents of this Magazine, either wholly or in part, may be reprinted without permission.

# Contents

OUR SOIL BACTERIA By James A. Smith 5	TWO NEW COURSES FOR CHICAGO By Edward B. Dearie, Jr	
EXECUTIVES MEET AT INDIANAPOLIS By John Morley10	DON'T FORGET THE BIRDS By Chas. Erickson	2(
GREENKEEPERS CONFERENCE PROGRAM10	LARGER AND BETTER TEES By John Anderson	2(
CHAIRMAN BURKHARDT SAYS14	AMHERST COURSES OPENS JANUARY 2	27
COLLYER ENCOURAGES GREENKEEPERS	AROUND THE OFFICE DESK	21
By J. H. Evans	MARKET PLACE AND BUYERS' GUIDE	2:

# Officers-National Ass'n of Greenkeepers of America

John Morley, President Youngstown Country Club 2248 Selma Avenue Youngstown, Ohio

John MacGregor, First Vice Pres. Chicago Golf Club Box 717, Wheaton, Illinois

ELMER F. AFFELDT, Glen Oaks Golf & Country Club, Great Neck, L. I., New York.
JOHN ANDERSON, Crestmont Coun-try Club, W. Orange, N. J.
WALTER G. ANDERSON, Sunne-hana Country Club, Johnstown, Penn.
A. E. ARNOLD, Masonic Country Club, Grand Rapids. Mich.
C. J. AUGUSTO, Del Monte Country Club, Grand Rapids. Mich.
G. BARTON, Sylvania Golf Club, Banff, Alberta, Canada.
G. BARTON, Sylvania Golf Club, Toldo, Onio.
BASHAM, River Crest Country Club, Fort Worth, Texas.
Massen Billing, Penn.
M. BOSTIC, Biltmore Forest Coun-try Club, Banff, Alberta, Canada.
M. BASHAM, River Crest Country Club, Fort Worth, Texas.
Massen Billing, Penn.
Massen Billing, Penn.
M. BOSTIC, Biltmore Forest Coun-try Club, Banff, Alberta, Canada.
M. BOSTIC, Biltmore Forest Coun-try Club, Banff, Alberta, Canada.
M. BOSTIC, Biltmore Forest Coun-try Club, Banff, Alberta, Canada.
Massensin, Penn.
<

Lewis M. Evans, Second Vice Pres. Cedarbrook Country Club Mt. Airy, Philadelphia, Penn.

Wm. J. Sansom, Third Vice Pres. Toronto Golf Club Long Branch, Ontario, Can.

## DISTRICT VICE PRESIDENTS

DISTRICT VICE PRESIDENT:
 E. E. DAVIS, Meadville Country Club, Meadville, Penn.
 THOS. E. DOUGHERTY, Springhaven Country Club, Chester, Penn.
 GORDON W. EARL, Ogdensburg Coun-try Club, Ogdensburg, N. Y.
 CHARLES ERICKSON, Minekahda Club, Minneapolis, Minn.
 D. ALLEN FRASER, Berkshire Hunt and Country Club, Lenox, Mass.
 FORD GOODRICH, Flint Country Club, Flint, Michigan
 JOHN GRAY, Essex Golf and Country Club, Sandwich, Ontario
 HARRY HANSON, Maple Bluff Coun-try Club, Madison, Wisconsin
 H. HAWKINS, Lakeview Golf Club, Port Credit, Ontario
 ROBERT HENDERSON, Country Club of Buffalo, Williamsville, N. Y.
 ARTHUR J. JENSEN, Fargo Country Club, Fargo, N. D.
 OSCAR JOHNSON, Happy Hollow Club, Omaha, Nebraska
 M. W. LAWRENCE, West End Coun-try Club, New Orleans, Louisiana
 GEORGE LIVINGSTON, Blelle Meade Country Club, Asakville, Tenn.
 HUGH LUKE, Garden City, Country Club, Garden City, N. Y.
 WILLIAM MAYNE, Jasper Park Lodge, Alberta, Canada
 JOE P. MAYO, Pebble Beach Country Club, Pebble Beach, Calif.
 CHESTER MENDENHALL, Sim Park Golf Club, Wichita, Kansas
 T. H. RIGGS MILLER, Richmond Country Club, Staten Island, New

- T. H. RIGGS MILLER, Richmond Country Club, Staten Island, New York

George Davies, Fourth Vice Pres. Big Springs Golf Club Louisville, Kentucky

John Quaill, Secretary-Treasurer Highland Country Club 426 Highland Avenue West View, Pittsburgh, Penn.

HUGH C. MOORE, St. Simon's Island Golf Club, St. Simon's Island, Georgia JAMES MUIRDEN, Ridgewood Golf Club, Cincinnati, Ohio JOSEPH O'GRADY, New Bedford Country Club, New Bedford, Mass.
WILHELM PETER, Lynnhaven Golf Course, Kansas City, Mo.
JOHN PIRIE, Country Club of Fair-field, Fairfield, Conn.
CLARENCE PLOSS, Salem, Mass.
WALTER C. REED, Westwood Coun-try Club, St. Louis, Mo.
CAPT, DAVID L. REES, Progress Country Club, Purchase, New York
CHARLES A. ROBINSON, Brookside

CHARLES A. ROBINSON, Brookside Country Club, Lake Tarleton, Pike, N. H.

GEORGE SARGENT, Scioto Country Club, Columbus, Ohio

ROBERT SCOTT, Baltimore Country Club, Baltimore, Maryland H. E. SHAVE, Oakland Hills Country Club, Birmingham, Mich.

FRED J. TIENKEN, Colorado Springs, Colorado

D. R. VALENTINE, Beaumont Coun-try Club, Beaumont, Texas JOSEPH VALENTINE, Merion Cricket Club, Philadelphia, Penna.

- GEORGE WELLIN, Tumblebrook Country Club, New Britain, Conn. JACK WELSH, Wakonda Country Club, Des Moines, Iowa
- WALTER WOODWARD, Senneville Country Club, Montreal, Quebec, Country Canada

Official communication, membership dues, employment, etc., should be mailed direct to the Secretary. Editorial articles, photos, subscriptions and golf show requests mail to 405 Caxton Bldg., Cleveland

# BIG REDUCTION IN PRICES —Ideal "Bulldog" Fairway Mowers

SINCE their introduction some six years ago, IDEAL BULLDOG MOWERS have constantly grown in favor. Not only has a high standard of quality been maintained but improvement in design and construction has at all times kept pace with the development of golf.

Each year more and more clubs and parks have learned of their operating economies. Sales have mounted steadily. In 1929 the increase in the sale of Bulldog Mowers showed *a gain of 97 per cent* over the best previous year's business.

Greater volume has reflected in lower manufacturing costs. Quantity purchases bring more favorable prices on materials. A greater production schedule effects big saving in shop operation and has warranted the installation of new automatic, labor saving machinery. Sales and distribution costs are lower.

As a result of these savings both the Ideal 3-gang Bulldog Mower and the Ideal 5-gang Bulldog Mower are to be offered at *substantially lower prices for 1930*.

The new low prices will be ready for public announcement at the opening of the 4th Annual Show of the National Association of Greenkeepers in Louisville, Kentucky, February 4th to 7th, 1930. Be sure to call at the Ideal exhibit and secure full particulars.

# Ideal Power Lawn Mower Co. LANSING, MICHIGAN

237 Lafayette St. 413 W. Chicago Ave. 161 Vester St. 273 Boylston St. New York, N. Y. Chicago, Ill. Ferndale (Detroit), Mich. Brookline, Mass. January 1930 Volume IV Number 1

# The NATIONAL GREENKEEPER

The Leading Journal of the World on Turf Culture and Golf Course Maintenance

Official Organ of The National Association of Greenkeepers of America

# Our Soil Bacteria How they live and what they do for us BY JAMES A. SMITH

T IS difficult to tell a good story of the life of plants, many of whose members cannot

be seen under the most powerful microscope. We know they do exist and are necessary to the maintenance of life upon this earth, so they concern us most vitally.

Ask an electrical engineer "What is Electri-

city" or a hydraulic engineer "What is Water" and they will both tell you that they do not know, still they apply their lives to getting the most out of what they know to be the working forces of each.

We recognize soil bacteria when it is possible for us to see them, know how they live, how they reproduce and comprehend what they do for us. Taken in their simplest form, and eliminating all types which are not of value to us, I advise that as early as possible you get interested in them.

It is necessary to remember three groups. First, those which produce Ammonia as the first

step in breaking down organic matter. Second, those which add six atoms of Oxygen to the Ammonia to make Nitrous Acid and, lastly, those which add two atoms of Oxygen to the Nitrous Acid to make it Nitric Acid. This Nitric Acid combines with lime or some other base to make the Nitrates that are absolutely essential and necessary to plant life.

It seems to be human nature to give the smallest things the largest names and, unless you are particularly interested, I advise you to forget the names of these bacteria as early as possible. They are bound to be confusing. The first group are called Ammonifiers because they

> produce Ammonia. The second, Nitrosomonas because they produce Nitrous Acid from the Ammonia which is made by the first group. The third, Nitrobacter as they prepare the Nitric Acid which, combined with lime or one of the other bases in the soil, makes the finished product, a Nitrate. These three groups taken together are called the Nitrobacteria.

> These Nitrobacteria are not "bugs" as many suppose but are the smallest form of plant life known. They are so small that it is possible for one billion of them to live in an ounce of good soil which of course must provide an ideal home. One healthy

member may branch out and be the father or mother of seventeen million of offspring in twenty-four hours. The fact that they are a plant life, even though of a low form, creates the necessity for a balanced feeding practically the same as any higher form of plant life. What they produce is entirely through chemical ac-



JAMES A. SMITH, LONDON, O. Mr. Smith is a recognized authority on soils. During the war he worked for the U. S. Dept. of Agriculture

# The National Greenkeeper

# Tests of Plugs from Putting Greens From Ohio Humus Laboratory, London, Ohio



PLUG FROM GREEN 202

THESE photographs were taken from plugs during the early fall before close cutting had been stopped. They show how the amount of soil humus present controls the amount of water and air it is possible to get in the soil of the green. Also the rootage which comes from the creation of healthy conditions for our Nitrobacteria.

Green No. 202. This green required ten hours of slow watering in order to get one and one-half inches of penetration. Conditions in this green were uniformly bad with a very low soil humus content.



PLUG FROM GREEN 209



PLUG FROM GREEN 207

Green No. 207. This green required thirty minutes for a penetration to four and one-quarter inches which was the depth of rootage and the limit of abundant soil humus. One inch hose at 35 pound pressure at the green was used. This green was one year old the day sample was taken.

The lower white line on each cross section of each plug indicates the depth of greatest soil humus supply and depth of rootage. Below this line, moisture penetration was very slow.

Green No. 209. This green required three hours of slow watering for a penetration of three inches to which depth rootage extended. This green by careful watering was kept in fair condition. The amount of soil humus was greatly increased over Green No. 202. There was no humus added in the original construction of the above green. tion and the types we have mentioned and which are the only ones we should be interested in, never vary their product. For centuries they have been making either Ammonia, Nitrous or Nitric Acid and will continue to do so until the end of time.

## Bacteria Must Have Air

THEIR associates are not always of the best. If you insist upon their living in soil containing too much water, without air for an oxygen supply with which they may work, their enemies the Denitrifiers, who do not live in the presence of air, step in and commence to feed upon the Nitrates which they have produced. This parisitic action continues until they have broken down the entire product so laboriously made by the Nitrobacteria, returning it possibly to the air as free nitrogen which plant life cannot use. In this same unaerated soil may lurk the bacteria of cholera or typhoid fever ready to be leached out and carried into drinking water with serious effect on mankind. Fresh air allowed to pass into the soil, at once destroys all but the desired bacterial life.

There are five conditions necessary for the activity of Nitrobacteria in creating plant feedings as Nitrates.

- 1. The Presence of Food.
- 2. A Supply of Oxygen.
- 3. Moisture.
- 4. A Favorable Temperature.
- 5. Absence from Strong Sunlight.

The Presence of Foods-Nitrobacteria have but one food and that is the soil humus, an active form of organic matter. Any organic matter such as wood, straw, straw manure, decayed leaves, etc., exposed to the above conditions in the soil at once begins to decay. Manures, because of their straw and fibrous content very quickly disappear when worked into the soil. If soil humus is to be made from ordinary stable manures it should be put in the soil and kept under constant cultivation for at least three years before the maximum nitrate conditions should be expected. There should never be less than sixty tons of manure in a one acre compost area in order to get the most efficient top dressing.

A Supply of Oxygen-They must have air

at all times, because from the air they obtain the oxygen with which to carry on their work. The moment air is denied them, they are at once compelled to stop production and the denitrifiers very likely begin operation.

Moisture—All chemical reactions must take place in the presence of moisture and, since their work is entirely chemical, a lack of moisture stops them. You are familiar with the old Seidletz Powder, the white paper containing tartaric acid, the blue paper bicarbonate of soda with Rochelle salts added as a laxative. They could be mixed dry without any chemical action taking place but the moment water was added they commenced a violent effervescence. So, moisture must always be present in order that there may be chemical action.

Due to the breaking down of organic matter, carbonic acid gas is given off. If sufficient moisture is present this gas will be absorbed, carbonic acid produced and this acid can be used in digesting out feedings which may be in the soil mixed with the soil humus and which can later be taken up by the plant.

A Favorable Temperature—A favorable temperature for the growth of the Nitrobacteria is always necessary. The moment the soil temperature gets below 45 deg. F. their action stops. They can keep up their plant feeding at a temperature as high as 110 deg. F. Above that they again stop. The bacteria of the soil are very similar to those of yeast our mothers used in making bread. When the yeast was raised at night it was sure to have been placed in a warm part of the room. If the temperature of the yeast during the night dropped below 45 deg. F. we had no bread the next day.

I have always thought that sanding of greens, where this top dressing was not protected by good turf, was a bad practice. Upon hot days the heat of the exposed sand was almost sure to bring the temperature above 110 deg. F. at which point at least all bacteria close to the surface suffered severely, not to mention the increased evaporation from the green.

Some soils are in their natural construction much warmer than others or become warmer because of exposure to the sun in a protected place. A warm soil, because of its earlier bacterial activities and feedings, always produces the first good turf.

In the fall with a temperature drop to below 45 deg. the development of plant life stops. In the spring as soon as soil warms to 45 deg. or more our Nitrobacteria again become active and our turf starts growing.

Absence from Strong Sunlight—In the presence of strong sunlight we have no active bacteria. It is an old custom to hang disease infected bedding in strong sunlight to kill any traces of bacteria which it might carry. The same holds good of our soil bacteria.

Nature has been very careful in providing a home for it in our soil humus not only because it provides it with food but because of the assured darkness which it requires. From this, the reason for the more rapid growth of turf at night-time, due to darkness, is at once apparent. During the night even the bacteria close to the surface are active.

Throughout the process of the decay of soil humus by these organisms, certain very important acids are formed. If they are acting in black humus a Humic Acid is produced and if in a brown humus an Ulmic Acid. The Humic Acid will combine with soil particles with which the soil humus is mixed, producing Humates which is the natural source, without chemical fertilization, of our potash and phosphorous feedings. The action of the Ulmic Acid in the soil while similar to that of Humic Acid is not quite so pronounced.

Going over the five conditions mentioned above, with your turf problems in mind, you may gather some clue as to the possible correction of some of your soil conditions which are not producing the greatest number of these active Nitrobacteria. A hard surface green or fairway, deficient in soil humus, would prevent the passage of moisture and air to your Nitrobacteria and consequently their power to produce feedings would be suppressed. Equally aggravating would be the activities of the Denitrifying bacteria which can exist only under these adverse conditions.

# Two Text Books on Bacteria

THERE are two text books, easily understood which I believe should be in the hands of every greenkeeper as a nucleus for a practical library. "Soils: Their Properties and Management" by Lyon, Fippin and Buckman is one and Lipman's "Bacteria in Relation to Country Life" is the other. Both of these books are easily understood and make very interesting reading. If you are interested I think the editor of the NATIONAL GREENKEEPER will be glad to tell you about them.

Concerning soil conditions as affecting Nitrobacteria the first mentioned volume produces a table showing the number of bacteria found on farms in widely separated states. I recall counts made on two Kansas farms. The soil drawn was taken to a depth of thirty inches. The first sample was a loam, rich in soil humus. It was stated that 53,596,060 Nitrobacteria was found in each gram of soil, one gram equaling about one twenty-eighth of an ounce.

On another Kansas farm with thin top soil and a gumbo sub-soil but 78,534 Nitrobacteria were found in each gram. This latter number I imagine very nearly represents the active bacterial count that might be expected in the top six inches of many of our hard greens.

I recently made a physical examination of the top eight inches of the soil of a green which had never been successful. The top one and onehalf inches had a good humus content and must have been selected with care. The turf rootage extended to this depth. The next four inches was a very dark soil which must have been hauled to the green and spread over the original contours to a depth of four inches. It proved to be almost entirely deficient in soil humus and it was almost impossible to get water into it. It was a true home for everything but the really necessary Nitrobacteria. Strangely, the original soil upon which this green was built and which was taken five and one-half inches below the surface of the green, was far superior to the other two soils in every respect.

Do not make the mistake of thinking that all black soil is rich in soil humus. But little of it is. Years ago it may have contained an active humus but now what was once an active humus has been completely digested by the Nitrobacteria, becoming wholly inactive, leaving nothing in the soil on which they can live. It is truly a gumbo soil rich only in carbon. Keep away from dark soils for that reason. They are dangerous. All soil humus is organic matter but all organic matter in the soil is not soil humus.

Never build a green without adding an ample amount of lime mixed in your construction. As our soil bacteria create Nitric Acid there must be some base, such as lime, in the soil with which it may combine to make a nitrate suitable for plant feedings.

There is little doubt but that our Nitrobacteria are still fairly active in many of our greens heavily acidulated through the use of Ammonium Sulphate. Our lack of feedings on such greens may be due to the fact that the Sulphuric Acid additions from Ammonium Sulphate have used up all the lime or similar basic salts present in the soil of the green and there no longer remains one of these bases which can take up the Nitric Acid produced by the bacteria and make it into Nitrate feedings. The amount of lime which would be used would not be sufficient to cause detrimental turf conditions.

If your construction is such that your soil bacteria have sufficient moisture and air to a depth of five inches, you are having but little trouble with your greens. If the count of your Nitrobacteria is small, because of firm and hard packed soils in your greens, no artificial feedings which you may apply can permanently revive them. A beaten path, has in the soil but few Nitrobacteria. It is a natural home of the Denitrifiers.

# Excellent Standard

THE NATIONAL GREENKEEPER Cleveland, Ohio

Gentlemen:

I have been Green committee chairman at the Hammond Country Club for five years and have been an interested reader of your magazine since its first publication, and wish to congratulate you on the excellent standard you have maintained.

Please mail me a copy of the ABC of Turf Culture for which I am enclosing my check for three dollars.

## Yours very truly,

(Signed) E. Spraker, Chairman Green Committee, Hammond Country Club, Hammond, Louisiana



Above cut shows Model A Staude General Utility Golf Course Tractor with cubic yard Steel Dump Body

EASY

PRICE



Above cut shows complete Model T Staude General Utility Golf Course Tractor with cubic yard Steel Dump Body



Sold Under a Money-Back Guarantee.

Write for Full Particulars.

E. G. Staude Mak-A-Tractor Co. 2630 University Ave. St. Paul, Minnesota

# **Executives** Meet in Indianapolis

President Morley outlines plans for the Louisville Convention and Golf Show BY JOHN MORLEY, President The National Association of Greenkeepers of America

TWICE each year, according to our by-laws, it becomes necessary for me as President of the National Association of Greenkeepers of America to call together the members comprising the Executive Committee. Having held our summer meeting in New York City, I was of the opinion that the fall meeting should be held JOHN MORLEY

somewhere in the middle West in or-

November 25. On Saturday previous to the meeting those members living in the Eastern section met at Cleveland so that we might entrain for Indianapolis- together. Those present were John Quaill, W. J. Sansom, Fred A. Burkhardt. Christopher Bain. Mr. and Mrs. Lewis M. Evans and son John and myself. Previous to train time we were guests of Mr. and Mrs. Fred A. Burkhardt and with the aid of his three estimable daughters we were treated to an excellent dinner and later resumed our way by rail westward, arriving at Indianapolis early Sunday morning.

Upon our arrival at our headquarters, Hotel Lincoln. we were pleased to meet our



first vice-president John MacGregor and Alex Binnie, president of the Mid-West Greenkeepers Association, both belonging to the Chicago district. Immediately after lunch through the kindness of Carl A. Bretzlaff, secretary of the Indiana Greenkeepers Association, Chester Coval, Mr. Bretzlaff's assistant and George Hawkins who has charge of the famous Speedway and

der to get in closer touch with our member- golf course adjoining, we were taken by autoship in that territory. So I decided to hold mobile to inspect a few of the courses in the our second meeting at Indianapolis, Monday. Indianapolis district.

# Greenkeepers Conference Program

4th Annual National Greenkeepers' Conference and Convention, Jefferson County Armory, Louisville, Ky., Feb. 5, 6, 7, 1930.

### Chairman George M. McClure Soil Technologist, Ohio State University

WEDNESDAY, FEBRUARY 5-2:00 P. M.

Introduction of chairman by President John Morley. Addresses of Welcome-By Henry Heyburn, Louis-ville, Ky.; by Vertner D. Smith, Pres. Louisville C. C.; by Harry Dumesnil, Pres. Big Spring Golf Club; by Joseph C. Steidle, Pres. Audubon C. C.

The Fraternal Side of Greenkeeping-By Lewis M. Evans, Philadelphia.

Seeds and Grasses-By Prof. L. S. Dickinson, Amherst, Mass.

Functions of the three plant food elements-By A. E. Grantham, Richmond, Va.

- THURSDAY, FEBRUARY 6-2:30 P. M.
- The Life and Activities of Soil Bacteria-By James A. Smith, London, Ohio.
  - Experiments in the Turf Nursery-By Dr. Howard B. Sprague, New Brunswick, N. J.

The Trend of Greenkeeping-By O. J. Noer, Madison, Wisconsin.

Drainage and Soils-By Wendell P. Miller, Columbus, Ohio.

### FRIDAY, FEBRUARY 7-2:30 P. M.

- My Cure for Brown Patch-By Prof. L. S. Dickinson, Amherst, Mass.
- Greenkeeping Problems in Canada-By W. J. Samson, Toronto, Ont.

Activities of the Green Section-By Dr. John Monteith, Jr., Washington, D. C.

Taking Care of the Trees-By Hon. Martin L. Davey, Kent, Ohio.

We were very much elated to find the courses, especially the putting greens in the pink of condition. After inspecting Avolon. Broadmoor and Highland courses we were escorted to the Speedway golf course and later had a ride (a little too fast for me), twice around this wellknown Speedway.

The sun having set over the Western horizon we journeyed on to the Meridian Hills Country Club. the home club of our host. Carl Bretzlaff. After inspecting his up-todate course we were escorted to the dining room where we were served with an excellent dinner that Mr. Bretzlaff had arranged for us.

On Monday morning bright and early we