The Effects of Poisons, Insecticides and Fungicides on Soil

BY JOHN QUAILL, Secretary
The National Association of Greenkeepers of America

IN THIS day and age of particular golfers who demand the best turf possible and sometimes impossible, the greenkeeper has his hands full keeping up his course and his reputation to say nothing of his religion at times.

Just about the time he thinks he has everything in good shape and is getting all set to take a little trip over into the next county to see how that new course is coming along, up jumps the devil and upsets all his plans. It is probably a dose of brown-patch that has stopped him from his pleasure this trip. Anyway we will say it is brown-patch.

Out comes the spray outfit, sprinkling cart or proportioner or whatever he uses and the greens receive a dose of mercury or bordeaux or some other chemical which was recommended to cure all the diseases, insects and weed troubles ever discovered. The brown-patch is probably checked and maybe cured, but what effects did it have on the organisms which are necessary to plant life?

We all know that bichloride of mercury is one of the oldest known disinfectants and germicides. Doctors and surgeons use it to sterilize their instruments and kill the bacteria. If it will kill bacteria for them why won't it kill bacteria in the soil? It is absolutely necessary that we have bacteria in the soil to grow grass, and without it we would not have any grass or weeds or any plant life and probably life of any kind would cease to exist.

There are several kinds of bacteria which are of vital interest to the greenkeeper. Some of them are the nitrifying bacteria, the nitrogen fixing bacteria, the denitrifying bacteria and the...
We will send a Lark postpaid for a 15 day free trial. Write for one TODAY. Price $15.00 each in the United States.

**Grass Seed of Known Quality**

**TESTED for PURITY and GERMINATION**

- South German Bent
- Colonial Bent
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Wholesale prices on above, or any other turf grasses, on request.

For the Finest Turf, Sow Bent

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Specialists in Golf Grass Seeds and Equipment

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fungi bacteria. The fungi bacteria, which causes brown-patch are the ones we are after when we use the mercury compounds. If it kills the fungi bacteria, why won't it kill the desirable bacteria also? It does and that is what makes the grass look so bad after we use it in very large doses.

Light doses do not affect the grass so much, but it does set it back some. Continued use of these fungicides will result in lowering the population of the desired bacteria so that heavier feeding of nitrogenous fertilizers will be necessary.

Now that brings us to another problem. If we use an acid reacting fertilizer such as ammonium sulphate to supply the nitrogen, we will get our soil so acid that we also reduce the desired bacteria. That means we will have to use more organic fertilizers to increase the bacteria. We will also probably have to use some lime to bring the soil back toward the neutral point to eliminate the excess acid in the soil.

Professor J. W. White of the Pennsylvania State College has experimented along these lines and has given us some very interesting figures concerning the effect of poisons on the bacteria. These figures were given the students at the Greenkeepers' Conference at Penn State in February.

Bichloride of mercury reduced nitrification 24%.

Semesan reduced nitrification 18%.

Where lime was used on the same plots with the bichloride, nitrification was increased 6%.

Lime on the Semesan plots increased nitrification 3%. From this we find that lime used where mercury has been used, we get a favorable result.

Prof. White also found that arsenate of lead increased nitrification about 8% and when lime was added to this plot, nitrification was further increased to about 15%.

Experiments with fungi bacteria were very interesting. He found that the fungi was more active in an acid soil than in a soil with an alkaline tendency. Following is the results of his tests.

**Soil reaction**

<table>
<thead>
<tr>
<th>Soil reaction</th>
<th>Bacteria per gram of earth</th>
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</thead>
<tbody>
<tr>
<td>pH 5.1</td>
<td>no lime 87,000</td>
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<tr>
<td></td>
<td>limed 16,000</td>
</tr>
</tbody>
</table>

**THE LARK SPRINKLER**

Greenkeepers prefer the LARK because of its dependable, never-failing performance. Wide coverage; even distribution from center to outside circumference on any pressure; positive, slow movement; perfect spray control—these are but a few of the reasons the Lark is the finest sprinkler built.

We will send a Lark postpaid for a 15 day free trial. Write for one TODAY. Price $15.00 each in the United States.
To meet the demand for Golf Course Work today—

Water Hose must be of the best materials and workmanship that can be obtained. This, we have accomplished in

**Super Par Golf Hose**

It is constructed with two braids, special three ply cord yarn, extra thick black smooth rubber cover that will withstand the roughest use.

The Philpott Rubber Company

1381 West Third St. - Cleveland, O.

Manure and fertilizer applied

<table>
<thead>
<tr>
<th>Substance</th>
<th>pH</th>
<th>lime</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manure and fertilizer</td>
<td>5.5</td>
<td>no lime</td>
<td>79,000</td>
</tr>
<tr>
<td>Manure and fertilizer</td>
<td>6.7</td>
<td>limed</td>
<td>10,000</td>
</tr>
<tr>
<td>Ammonium sulphate</td>
<td>4.42</td>
<td>no lime</td>
<td>129,000</td>
</tr>
<tr>
<td>Ammonium sulphate</td>
<td>5.2</td>
<td>limed</td>
<td>32,000</td>
</tr>
</tbody>
</table>

From this we find that the more acid the soil, the more fungi bacteria were found.

Well prepared compost and humus are necessary for the life of the nitrifying bacteria. They only work in soils where a supply of organic matter is available. A well broken-down compost that is made under the proper conditions contains innumerable bacteria. These little life giving cells are what is necessary for the production of turf. Give the little fellows a home and they will work for you as long as you don’t abuse them or feed them something that does not agree with them.

**Hyper-Humus Company**

Newton, New Jersey

Gives Quick Response on PUTTING GREENS

Gentlemen:—We used Hyper-Humus during the present year to replace mushroom manure or compost in top-dressing (one-third Hyper-Humus, one-third topsoil and one-third sharp sand, by volume), and find that it gives very quick response when applied with fertilizer. It is much handier to use than compost and, if costs are considered, we believe it is much cheaper. We know that it contains a high percentage of useful bacteria which quickly convert such fertilizers as Urea, ammonium sulphate and cottonseed meal to the readily usable form.

Very truly yours,

W. W. Rhodes.

Green Committee, Wilmington Country Club, Wilmington, Delaware.

Write for literature and approved methods of application to

HYPER-HUMUS COMPANY

Newton, New Jersey
TOURNAMENT SCHEDULE

MAY
15-16 Walker Cup Matches, St. George's Course, Sandwich.
26 British Amateur, St. Andrews, Scotland.

JUNE
18-21 St. Albans' Amateur Championship, St. Albans' Golf Club, St. Albans, L. I.
23-24 Ohio State Amateur Championship, Toledo Country Club, Toledo, O.
24-25 Invitation Open Tournament for Shawnee Shield, Shawnee C. C., Shawnee-on-Delaware.

JULY
8-11 California Junior Championship, Del Monte, Calif.
10-11 Northern California Women's Golf Association Invitational Tournament, Del Monte, Calif.
10-12 National Open, Interlachen C. C., Minneapolis, Minn.
17-19 Fairview Open Championship, Fairview Country Club, Elmsford, N. Y.
31 Invitation Tournament for Buckwood Trophy, Shawnee C. C., Shawnee-on-Delaware, Pa.

AUGUST
1-3 Midsummer Tournament, Del Monte, Calif.
5-11 National Public Links Championship, Municipal Golf Course, Jacksonville, Fla.

SEPTEMBER
30-October 1 Arcola Senior Championship, Arcola Country Club, Arcola, N. J.

OCTOBER
13-18 Women's National Championship, Los Angeles Country Club, Los Angeles, Calif.

One Man Can't Run It
Fellow Greenkeepers:
It was during the year 1926 that the National Association of Greenkeepers was born. When in the embryo stage great care was given in outlining the aims and objects of our organization and deliberations on the destiny of the association were long and I believe wise.

It was then decided that no one individual would ever control the organization, because some time some individual might use the office for mercenary purposes. It is not the intention of the organization to take the voice of the membership out of the association. Justice, benevolence, and education is the foundation of the N. A. G. A. and one man is not big enough to give all of these.

The workings of our organization when the Convention is not in session, is left entirely in the hands of the Executive committee. All matters of importance must be presented to this committee, and further, to prevent any radical move, any member who has a grievance must first present it before a special committee which must present its findings to the executive board.

There are seven special committees consisting of seven members, each selected and appointed by the President. Each committee is a necessary part of the organization. The duty of the President is to receive instructions and see that they are faithfully performed.

By John MacGregor,
First Vice President, The National Association of Greenkeepers of America.

Golf Business Is Good
We have heard a lot about hard times, poor business, etc., since the little party in Wall street last fall. But the golf business is good if purchases of equipment may be considered a fair barometer.

W. L. Austin, sales manager of the Ideal Power Lawn Mower Company has written us an interesting letter on this subject from which we quote as follows:

"First and most important is the fact that 1929 was the best year our company ever enjoyed and for the first three months of that year, January, February and March, the business was exceedingly satisfactory due to a certain extent that last year we had some very early warm weather, in fact, in some sections even in the north they were actually mowing the latter part of March last year.

"We had our doubts about this year being able to equal last year's sales record, but so far we have not only equaled last year's record but exceeded it to a very gratifying extent. The actual increase for the first three months of 1930 on the sale of our line of grass cutting equipment, including power mowers, fairway mowers, and putting green mowers, is 28%. The biggest percentage of this increase has been due to the extra good business that we have enjoyed so far this year from sale of fairway mowers and put-
Dear Col. Morley:

Association of Greenkeepers, and deeply appreciate the sentiment expressed in your cordial letter which accompanied the certificate of membership. I feel much 

more than 1000 golf clubs sow Scott's Seed

Dickinson Praises Association

Massachusetts Agricultural College

Amherst, March 22, 1930

Col. John Morley, President

National Association of Greenkeepers of America

2248 Selma Avenue

Youngstown, Ohio

Dear Col. Morley:

I accept the honorary membership to the National Association of Greenkeepers, and deeply appreciate the sentiment expressed in your cordial letter which accompanied the certificate of membership. I feel much more than 1000 golf clubs sow Scott's Seed

As a matter of fact our golf business has never been so satisfactory as it is this year. Not only have we stepped up sales of fairway mowers but the putting green mower that we first introduced last year is having a splendid sale this spring and we have also had a very fine business on the new Bulldog rough units that we just put on the market for the first time in 1930.'"
Airport Drainage
Armco Culvert Mfrs. Association
Wendell P. Miller and Associates

Ball Washers
J. Oliver Johnson, Inc.
Worthington Mower Company

Ball Locators
Worthington Mower Company

Bent-Coos County State Sealed and Certified
J. M. McCullough's Sons Company
Bent Seed—Cocos Creeping
Lyman Carrier, Inc.
Stumpp & Walter Company
Bent Seed—Prince Edward Island
J. M. McCullough's Sons Company

Bent Stolons
Hubbard Nurseries
O. M. Scott & Sons Co.
Stumpp & Walter Company
Ohio Humus Products Co.
Illinois Grass Co.

Bridge Floors
Armco Culvert Mfrs. Association

Cast Iron Pipe
McWane Cast Iron Pipe Co.
Charcoal
Cleveland Charcoal Supply Co.

Compost Distributors
Toro Mfg. Company
MacGregor Compost Distributor Co.

Compost Mixers
Toro Mfg. Company
Universal Sand Equipment Co.

Compost Screen
Ideal Power Lawn Mower Company

Drainage Engineers
Wendell P. Miller and Associates

Drainage Gates
Armco Culvert Mfrs. Association

Dust Baskets
Toro Mfg. Company
J. Oliver Johnson, Inc.
Worthington Mower Company
Peter Henderson & Co.

Fairway Irrigation
Buckner Mfg. Co.
Thompson Mfg. Co.
Economy Irrigation Company

Fairway Mower Blades
The Budd Mfg. Company

Fairway Mowers
Pennsylvania Lawn Mower Works
Toro Mfg. Company
E. G. Staude Mak-A-Tractor Co.
Ideal Power Lawn Mower Company
Worthington Mower Company

Fairway Rollers
Toro Mfg. Company

Fertilizers
Milwaukee Sewerage Commission
J. Oliver Johnson, Inc.
Peter Henderson & Co.

Fertilizer Sprayers
John Bean Mfg. Co.

Keep your mowers sharp always.
Use a Hardinge Mower Sharpener

Henry H. Doty, Manufacturer
Glenview, Illinois

Pennsylvania Lawn Mower Works
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NEW CATALOGS

Worthington Mowers

A very handsome new catalog has just been issued by the Worthington Mower Co., Stroudsburg, Pa., manufacturers of well known Worthington mowers, tractors and mowing equipment. It is handsomely illustrated with photographs of well known golf courses throughout the country where Worthington equipment is used, also athletic fields and airports that rely on Worthington equipment for their upkeep.

The Worthington slogan, "The Spring's the Thing" refers to the spring which holds the cutters firmly in place either down to the ground or at any prescribed distance from it, thus producing a close smooth lawn or an even uniform length of rough. This is said to be an exclusive feature.

A part of the catalog is devoted to the new model Overgreen which is a power putting green mower with three units giving great flexibility and uniform cutting on uneven surfaces.

A final chapter on "Taking Care of Mowing Machinery" gives some very practical advice to those who have charge of this important equipment. A copy of this splendid catalog will be mailed to any greenkeeper who will write for it and there will be no charge.

Golf Course Supplies

The new 1930 catalog of Arthur D. Peterson, Inc., 11 East 44th Street, New York City, is a splendid piece of work. It covers the extensive line of golf course supplies and equipment which this company handles and which includes such well known products as Worthington mowers, Royer Compost mixers, Pennsylvania and Ideal putting green mowers, Boss rollers, Meeker harrows and discers, Peerless grinders, and a host of other items.
the market in a small way since 1925. During the past four years it has been used in the vicinity of New York and the results are said to have been very satisfactory.
The Peterson catalog gives prices of all pieces of equipment and is an invaluable directory for the greenkeeper. It will be sent free upon request.

Hand Versus Power for Mowing Greens
Pennsylvania Lawn Mower Works, 1645 North 23rd St., Philadelphia, Pa., has just issued a new two-color folder setting forth decisively their opinion that for fine greens mowing there is still no substitute for a properly designed hand-operated machine.

Milorganite for Turf
Milorganite, and its special use as a carrier for applying lead arsenate in the control and elimination of grubs, is covered in a new circular just issued by the Milwaukee Sewerage Commission, Milwaukee, Wisconsin. The rate of application is 5 pounds lead arsenate and 25 pounds of Milorganite for 1000 square feet of turf or 200 pounds of lead arsenate and 800 pounds Milorganite to the acre.

Complete instructions are given for applying this combination mixture and the effect is to carry the lead where it will do the most good and also furnish a fertilizer that stimulates and strengthens the turf, so that it can resist the ravages of disease.

Photographs are given showing actual close-up conditions where grubs are working with the dead turf rolled back and the grubs exposed.

A copy of this exceedingly interesting circular will be sent without charge to any chairman or greenkeeper who may write for it.

Universal Appoints Agents
The Universal Sand Equipment Co., of Cleveland, Ohio announce the appointment of the following golf equipment dealers to handle the Universal Compost Mixer:


“Centepede” Grass
This remarkable grass, new to this country, at least so far as general propagation is concerned, is being put on the market by the Stump & Walter Co., 30-32 Barclay Street, New York City. This concern considers it the best grass for not only Florida, but any location south of Virginia and west to California, under similar climatic conditions.

Quoting from this new circular the Stump & Walter Company says:

‘‘Centepede’’ is a dwarf-growing grass that spreads rapidly giving a luxurious turf that will withstand more abuse and hard usage than any other grass we know of.

‘‘Centepede’’ is also very desirable for grazing lands, making an ideal pasture grass on poor lands subject to erosion, and where Carpet and Bermuda Grass do not do well.”
the first six-cylinder golf tractor

PENNSYLVANIA Tractor was designed especially for general use on the golf course. Its powerful Chevrolet engine will take the hills smoothly and with absolutely no vibration. It is economical in operation and, like all PENNSYLVANIA golf equipment, extremely simple in design.

Wheel base, 87 inches; turning radius, 8½ ft. Maximum speed, 18 miles per hour in high. Strong rear axle to pull the heaviest load. Fully equipped with electric lights, self-starter and other standard Chevrolet equipment. Detachable steel dump body with capacity of one cubic yard.

Use this PENNSYLVANIA Tractor with PENNSYLVANIA Fairway Mowers for efficient, economical operation.

Write for further details and for catalog describing “New” Fairway Quint or Trio, the Super Roller and New Aristocrat green mowers and the new PENNSYLVANIA “Tee” Mower for trimming tees and approaches.

PENNSYLVANIA LAWN MOWER WORKS
1645 NORTH 23rd STREET
PHILADELPHIA, PA.

There is No Reason Why You Should Have Hard Surfaced Greens at Any Season of the Year

THIRTY TONS OF “WINDRIFT HARDWOOD” HUMUS COSTING $202.50 F.O.B. CAREY, OHIO—WHEN USED WITH THE OHIO GREENS CULTIVATOR—WILL GIVE YOU SOFT SURFACED GREENS AND GREATLY IMPROVE THE QUALITY OF YOUR TURF. GREENS SO CULTIVATED SHOULD REMAIN PERMANENTLY IN FINE CONDITION.

With each shipment of thirty tons of “Windrift Hardwood” humus we will loan an Ohio Greens Cultivator for thirty days so you may immediately disc and topdress your greens for the season.

To certain localities it is possible to make a shipment of a minimum car of twenty tons at a cost of $135.00 f. o. b. Carey, Ohio including Cultivator. Loaned for 30 days.

With each purchase of one Ohio Greens Cultivator sufficient “Windrift Hardwood” humus is furnished free of charge to prove its value.

The Ohio Greens Cultivator
Price $60.00
f. o. b. LONDON, O.

The Ohio Humus Products Company
JAMES A. SMITH, Pres. Box 95 LONDON, OHIO