The Proof of The Greens is in The Playing

By H. C. MOORE
Greenkeeper, Portsmouth Country Club, Portsmouth, Virginia

In writing a short article on greenkeeping, I must admit that while I am in a position to go into this phase of the golf course, I am at loss as to what is most important, therefore will try to give a general idea in a few words.

My present course is of just 9 holes, nicely trapped and boasts of the finest Bermuda greens in Tidewater, Virginia. It is well to keep the greens well top-dressed and I find that watering them at night, instead of the heat of the day, keeps the grass in splendid condition, even in the hottest weather and dryest seasons.

Traps Need More Attention

I find that the hardest job around the course is in keeping the traps in good shape, especially when they are found on the course in large numbers. On my 9 hole course, there are over thirty traps and this means care and attention at all times that I think equal to the care of the greens.

From my personal observation, I find that most greenkeepers overlook the traps and do not realize what it means to a player to have to play from poorly kept traps.

A greenkeeper who is on the job will go out of his way to meet as many of the golfers on his course as he can and get their views on what they find wrong with the course. They know lots of small things which escape the busy greenkeeper’s attention that could be remedied in a few minutes with very little trouble and by doing so, keeps the club officials in a good mood and the players in a complimentary frame of mind. That’s half the battle.

Good Machinery Wise Investment

There is no play in pushing a putting green mower in the hot sun and I realize that it is not necessary to say that good machinery is a vital necessity to any course. I would suggest that the club officials leave the matter of equipment up to the greenkeeper for he knows what he needs, and when they are ready to buy, it would be wise to have the greenkeeper present. He’ll save the club lots of money in a year’s time.

I find a Penn Mower unusually well suited for my greens. I have used it successfully for quite a time, and find that the upkeep is very small in comparison to the others I have had the opportunity to try out.

Keep your machinery out of the weather and have it in tip top shape at all times. Work with your men and not against them.

Maples in Virginia

I believe that I have found information regarding trees that should be a great help to courses that have

(Continued on page 31)
What is the best substitute for barnyard manure to use in building a compost bed? What is the best green crop to plant and plow under on a half acre of land I can use to start a continuous supply of top soil? This land is quite sandy.

Milwaukee, Wis.

If you are unable to obtain barnyard or stockyard manure, poultry or sheep manure will serve as fair substitutes, together with grass clippings. Leaf mold taken from the woods and thoroughly turned over in a sunny place for six months or so, then added to the compost bed is a valuable source of humus. Never use the leaf mold just as it is gathered. It must be aerated in an open place for several months before it is safe to use on greens. Soy beans, cow peas, clover or buckwheat make good green crops, and your idea of thus making a continuous supply of compost is good.

There is one sand trap on my course which is so situated that there is no down grade on any side. This trap is not properly drained, and I would like some good advice as to how to go about it to keep it free from water.

St. Louis, Mo.

The most economical and efficient way for you to drain this trap is to dig a French well, four to five feet square and four to five feet deep. Fill with rocks, then clinkers to within six inches of the top, invert a layer of sod over the clinkers, then six inches of sand. This should take care of the water. If not, then it may be possible to fill up the trap with soil and replace with a mound, if there must be a hazard at this point.

We have several large maple trees on our course which are dying out at the top. In the fall, we have noticed that the leaves on these trees now change to a different color than a few years ago. They used to change to yellow and red, now they turn a deep purplish red. What is the trouble?

Montpelier, Vermont.

Refer to the May issue of the Greenkeeper, in which C. M. Scherer in “Month by Month with the Trees” gives some very valuable information on this subject. Your trees are evidently under-nourished. For each tree use 200 pounds of blood and bone, incorporating it into the soil with a digging fork, so that the fine roots will not be injured. Thoroughly pulverize the top layer of soil, as this acts as a dust mulch and holds moisture. Examine the trees carefully for pests and report further.

We are troubled with land crabs on several of our greens. They make three or four holes every night. What can we do to kill them?

Waukesha, Wis.

Carbon disulphide, applied in the holes with a long nozzled oil can will discourage land crabs. Allow about six drops to a burrow, and close the openings tightly to allow the gas to work. Be very careful that no fire of any kind is allowed near where the men are working with this chemical, as it is very inflammable.

Why are my putting greens fine in May every year, and then go bad in July and August?

Columbus, Ohio.

A considerable amount of the nitrogen from sulphate of ammonia evaporates into the air in the form of a volatile ammonia gas during periods of extreme heat. July and August in your locality are the hardest months of the year on grass, and your greens probably need watering thoroughly every second day in mid-summer. Surface watering brings the feeding roots to the surface, while heavy watering encourages a deeper root growth. Try a well balanced commercial fertilizer, applied at the rate of six pounds per 1000 square feet about the first of July, top-dressing every three weeks as usual.

We planted a vegetative green last September, and put it into play this spring about April 1. Now the grass is in poor condition. Did we begin to play on this green too early?

Louisville, Ky.

It is apparent the green was not in condition to open for play on April first, although it should have been. The trouble was probably in the care of the new green. New vegetative bent should be top dressed often and lightly, and never allowed to become dry. Runners should be kept brushed up and the grass mowed closely. To get into proper condition, water often, cut close and top dress lightly every week.

There are morning glories on my course everywhere I look. What is the best way to get rid of them?

Alameda, California.

Morning glories may be eliminated by raking up and cutting close and often, which is the slow way. Or iron sulphate may be used, 1½ pounds to a gallon of water, immediately dragging with a chain harrow to bruise the plants and allow the iron to penetrate. Repeat when (Continued on page 34)
The ABC of Turf Culture

The Nature of Soil Acidity and Effect of Fertilizer Materials on Soil Reaction

By O. J. NOER

SOILS in regions of moderate to heavy rainfall gradually tend to become acid in character. Rain water as it passes down through the soil slowly removes basic or alkaline material and leaves an acid soil residue. The rate of change varies and depends principally upon the amount of rainfall and character of the material from which the soil was derived. In regions of limited rainfall soils rarely become acid. Very little water percolates down through the soil, and soluble alkaline materials are not washed out. In fact these materials accumulate at the surface due to upward movement of water and evaporation at the soil surface.

Most of the golf courses in the United States are located in areas where acid soils develop. Since clover and weeds can be controlled by regulating soil acidity, a clear understanding of how it is produced and measured is of vital importance in turf maintenance on golf courses. During recent years soil chemists have obtained a clearer picture of soil acidity and devised simple accurate methods for its determination.

How Soils Become Acid

The chemist groups chemical compounds into three classes. They may be acids, bases or salts. Acids and bases have opposite chemical properties, and may be commonly distinguished by their different behavior towards an indicator such as litmus. An acid turns blue litmus red and a base turns the red paper blue. Muriatic and sulphuric acid are common acids of commerce. Vinegar contains acetic acid. Lye and quick lime are basic substances.

When an acid and base are allowed to react together, they are said to neutralize each other. Each loses its distinctive properties and a salt is produced. Generally salts are neutral substances. However, some have acid properties and others are basic. Soils consist of complex and simpler organic and mineral salts. These may be acidic, basic or neutral in character and the soil reaction depends upon which predominates.

A simple example probably best explains how soils become acid. If a fragment of granite rock reduced to a fine powder, is placed in a vessel and agitated with pure water for a time, the water will change in reaction becoming basic. It turns red litmus blue. The granite powder is no longer neutral but acid in character. This same phenomenon takes place in the soil as water percolates through it. Basic material passes into solution and is washed out leaving an insoluble acid residue.

If the acid granite powder is suspended in water containing a little salt, the water soon becomes acid, and the powder loses its acidic properties. The basic part of the salt has been taken up by the insoluble rock powder and soluble acid released. This is what takes place when ammonium sulphate or potash salts are applied to the soil.

The soil contains two kinds of acids, insoluble and soluble, sometimes referred to as potential and active acidity. The insoluble or potential acidity is the reservoir from which the soluble or active acidity is produced. It is this latter which controls clover and weeds. Soils containing large amounts of insoluble acidity are capable of yielding much soluble active acidity.

Methods of Determining Soil Acidity

A large number of methods for the determination of soil acidity have been devised. Most of the older methods measure the insoluble or potential acidity and serve as criteria of the amount of lime required to neutralize the acids. The newer methods determine the active acidity and measure its intensity. The use of these methods enables the greenkeeper to follow the soil reaction and eventually obtain a condition unfavorable to clovers.

The term Ph is arbitrarily used to express active acidity. A neutral substance, that is one which is neither acid or basic, has a Ph of 7. Figures less than seven represent increasing degrees of acidity and those greater than seven, increasing degrees of basicity. A soil of Ph 6 is ten times more acid than one of 7, and one of Ph 5, one hundred times. Thus it is evident that small differences in Ph represent large differences in soil reaction. Most plants grow best in the range of Ph 6 to 8.
paratus. Portable sets now on the market are sufficiently accurate for field use, and can be employed as a guide in attempts to modify soil reaction. In principle the method depends upon the fact that certain color indicators develop characteristic colors at different Ph values. In operation the soil is allowed to come in contact with the proper indicator and the color developed is compared with those on an accompanying chart. Ordinary water should never be used in making the test. It often contains sufficient lime to give erroneous results. Rain water serves as the best substitute for distilled water. Obviously the indicator solution must remain in intimate contact with the soil sufficiently long to permit maximum development of color.

**Effect of Fertilizers on Soil Reaction**
The different fertilizer materials affect soil reaction. They either increase or decrease soil acidity. Soils have a remarkable power of resisting change so it is difficult to demonstrate the effect of single applications. It is only when applications are continued over an extended period that marked changes occur. Sandy soils are more easily changed than loam and clay soils.

The continued use of ammonium sulphate increases soil acidity. If the soil contains limestone particles, the ammonium sulphate reacts with it forming calcium sulphate and carbon dioxide. The calcium sulphate is washed out in the drainage water and the carbon dioxide escapes into the air as a gas. The ammonia in ammonium sulphate is also capable of displacing basic calcium contained in the mineral soil particles. This calcium disappears in the drainage water as calcium sulphate.

The ammonia taken up by the soil particles is gradually released and converted into nitric acid by the nitrifying bacteria of the soil, and combines with more calcium. The resulting compound is either taken up by the plants or leached from the soil.

Ammonium phosphate also tends to make the soil more acid but is not as effective as ammonium sulphate. Acid soils always contain iron and aluminum oxides, materials which have but little effect upon soil reaction. So long as either exists in the soil the phosphoric acid combines with them forming insoluble iron and aluminum phosphates. Consequently, lime or other basic material is not leached from the soil. The nitric acid formed by the action of the nitrifying bacteria on the ammonia is capable of removing basic material from the soil, and it is this action that increases acidity.

Sodium nitrate tends to make the soil less acid. The sodium is basic in character and is left to neutralize soil acids when the nitrate portion is taken up by the plant.

The effect of organic nitrogenous fertilizers depends upon the amount and character of the mineral materials they contain.

Acid phosphate decreases soil acidity. When applied to an acid soil insoluble iron and aluminum phosphate are produced and its lime released. The term acid phosphate is a misnomer so far as effect in soil reaction is concerned. Bone meal has the same effect only more marked because it contains more lime.

Potash fertilizers increase soil acidity. The potassium is taken up and held by the soil particles and an acid residue is left in the soil solution.

**Extreme Acidity Associated With Low Fertility**

Very acid soils are often low in fertility. Extreme acidity retards conversion of soil nitrogen to nitrates by depressing the activity of the soil nitrifying bacteria and other beneficial soil bacteria. Nitrate nitrogen is the form preferred by most plants. The growth of molds and fungi is often favored by acidity. These organisms require nitrogen and may deprive the turf of its limited supply. In acid soils phosphoric acid is held as insoluble iron and aluminum phosphate, and solution may not occur rapidly enough to satisfy the entire demand of the turf for phosphoric acid. Hence it is probably unwise to create greater acidity than is required to discourage clover and weeds.

**Acidity at Which Clover Fails**

Agricultural workers have investigated the effect of acidity on the growth of clover. It makes its best growth at Ph 6 to 8. At Ph 5 growth ceases. At Ph 5.5 it is very doubtful if clovers can survive, especially if the grasses are growing vigorously, and there is probably no advantage in attempting to increase soil acidity beyond that point.

The ball is held up best in turf composed entirely of grasses. Poor "ties" are obtained on turf containing clover. Hence soil conditions favorable to the growth of grasses must be maintained. Regulating soil reaction helps discourage clover.

Sufficient acidity is most easily obtained in regions where soils are normally slightly acid, but the persistent use of acid producing fertilizers will eventually prove effective even on non-acid soils. When a point is once reached where clovers fail, the soil should be maintained at that reaction, so as to make other conditions for growth as favorable as possible.

(\textit{Note: Illustration of practical soil tester will be found on page 24.})
MORE than three quarters of a century ago when Lowell the poet wrote, "And there's never a leaf nor a blade too mean, to be some happy creature's palace," he must surely have had in mind the thousand and one insects which live upon and in our plants and trees.

It is true, indeed, that it is exceedingly difficult if not impossible to find a leaf or a blade which is not the habitation of some insect. Fortunately many of the insects at least do no harm if they do not do some good. At the same time there is another great host of insects which are such evil-doers that they give their odious reputation to the whole family.

Three Classes of Evil Insects

The evil-doers, or in other words the insects pests which prey upon our trees, can be divided into three great classes on the basis of the kind of damage which they do. First, there are those which stick their beaks into the plant tissues and thereby suck out the juices which are in a way somewhat similar to the blood in our bodies. One insect with which we are all familiar that illustrates this type, is the mosquito. All of us have felt the pain resulting from a mosquito plunging his beak into our flesh for the purpose of sucking out his food. The aphids and scale insects feed in practically the same manner as does the mosquito. The second class is made up of insects which bite and chew their food. There is none of us I imagine who has not at some time been bitten by an ant or a pinching "bug." Most all biting insects, especially of this second group, feed on the leaves of our trees. The third class is in a general way similar to the second, but instead of feeding on the leaves they center their efforts on the wood of our trees and are called borers.

The type of damage which an insect does, to a large measure determines the method of attack which is to be used in an attempt to eradicate or at least control the pest. Those of the first class have to be controlled by applying some caustic substance which when it hits them burns them to death. Since the second class chew and swallow their food, they can be poisoned to death. The third class work in such a way that it is impossible either to hit them with some caustic substance or to kill them by applying some poisonous substance to their food. Sometimes it is possible to smother them to death by introducing into their burrows some poisonous gas, however, this is much more difficult than is the application in either the first or second class.

The story of the life of the aphids and scales, the sucking insects, is very interesting. They are all very delicate and tender insects. The aphids continue to exist because of the remarkably prolific reproduction which is constantly in progress. The scales are not quite so prolific but as soon as a youngster has found a suitable residence it settles down and secretes over itself a waxy covering which acts as a protective shield or scale under which the insect spends the rest of its life.

First Spring Hatch Aphids All Female

The aphids spend the winter in the form of eggs on the plants which they inhabit. With the first warm days of spring the eggs hatch and the remarkable fact about the aphids is that all of them are females. Within a
lea yes are not on the trees. The materials ordinarily
used are lime-sulphur or an oil of some kind. The
lime-sulphur is mixed with water one to eight while the
oils are usually diluted one part to fifteen. These are
sprayed or washed into the scale infested plants and the
death of the scale results.

Scurvy Scale
Pine Leaf Scale
Scurvy Scale

must be followed religiously in order to gain perfect
results. The material used in controlling these insect
pests is a tobacco product, nicotine sulphate, most com-
monly appearing on the market as Black-Leaf-40. The
nicotine sulphate is mixed with soapy water and applied
to the pests by means of a spray or by washing the af-
fected parts. Occasionally aphid injured leaves curl
badly so that the aphids are housed within the curled
leaves. It is then exceedingly difficult to hit them with
the spray mixture and sometimes it becomes necessary
to dip the branches in the solution.

This method of course applies only to small plants
which can be readily handled.

Along with this artificial control of the insects, we
have the help of their many natural enemies. Probably
the most persistent enemy they have is the “lady bug”
or as some prefer to call it, lady bird beetle. Both the
adult and immature beetles feed almost entirely on
aphids. Besides the beetles there are aphid lions, certain
flies, spiders and numerous other insects which gain
almost their entire subsistence from eating aphids.

Spray for Scale Insects When Trees Are Dormant

The scale insects do not produce quite so rapidly as
do the aphids, there being only three or four generations
in a growing season, but because of their waxy covering
they are protected from many of the ills of the aphids
and consequently are almost if not quite as destructive
pests.

In controlling scales it is necessary to spray with some
substance which is strong enough to either dissolve or
penetrate the waxy covering and kill the insect under-
neath. Any such substance is strong enough to kill the
leaves at the same time and consequently it becomes
necessary to spray for scale insects at a time when the
leaves are not on the trees. The materials ordinarily
used are lime-sulphur or an oil of some kind. The
lime-sulphur is mixed with water one to eight while the
oils are usually diluted one part to fifteen. These are
sprayed or washed into the scale infested plants and the
death of the scale results.
Control Canker Worms With Tangle-Foot

Among the worst offenders in the second class of insects is the canker-worm or measuring worm as some call it. These insects appear early in the spring and start eating the leaves almost before they are full grown. It is not at all unusual to see the leaves so full of holes that they appear as if a charge of shot had gone through them. Canker-worms are one of the few insects which can be controlled by banding the tree with tangle-foot. It happens that the female canker-worm moth has no wings and she has to crawl up the tree in order to deposit her eggs. The journey is made during the first warm days of the year, sometimes in late February and surely during early March. If the tangle-foot is not applied when these first warm days arrive, then it is of little use to apply it later.

Another serious leaf eater is the tussock moth caterpillar which usually appears in late June or early July. These pests are very destructive and possibly among the most aggravating of all our insects. After they have spent a part of their life on the tree they come down and wander around into the houses, on the fences, in fact they go almost everywhere. When they find a suitable place they spin their cocoons and in a few weeks come out as moths.

Almost everyone is acquainted with the web-like nests which appear on the trees, usually in August. These webs are the home of a very voracious leaf eater, the fall web worm. These caterpillars are the young of a very beautiful, almost snow white moth. They live entirely within their web. As they grow larger and need more food they enlarge their web to include more leaves.

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Slugs Skeletonize Leaves

There is still one other leaf eater which certainly should be mentioned because it is so common and attacks so many different kinds of trees.

These are the so-called slugs. They look very much like miniature tadpoles and are the young of wasp-like insect. They eat the substance off the leaves but do not eat the veins so that an injured leaf is in appearance only the skeleton of a leaf. Because of this type of injury the insects are sometimes called leaf skeletonizers.

Since all this class of leaf eaters chew and swallow their food the control measures are the same for the whole group. A poison in the form of a spray forms a protective covering for the leaves so that when the insect takes a bit of leaf it gets some poison and subsequently dies. There are many poisons which are applied but of all of them arsenate of lead is the best. This is usually mixed with water at the rate of two to three pounds for fifty gallons of spray and is applied to the leaves just before or just as the insects start to feed.

Borers Very Destructive

The third type of insect is the so-called borer. These instead of eating the leaves eat the wood and burrow within the trunks of trees. The one which is attracting

(Continued on page 32)
IN 1900 I came to the Minekahda Club, and I'm still on the job. They say nothing is permanent except change, and we have all seen many changes during the past twenty-seven years.

First we used five Pennsylvania mowers, five horses and five men to cut the fairways, and we could scarcely keep the grass down within reason. Still we had another team for general work and mowing the rough with a hay mower. A clean golf course was never seen in those days.

The first change I made was connecting two heavy and substantial Pennsylvania mowers, and pulling them with two horses to save the labor of one man. Then as time went by Townsend came out with a triplex, the wonder of the age, and these mowers did good work. For two years I used two of these rigs, cutting out the labor of three men. But I was not satisfied, so began to study what I could do. I made one rig out of five mowers, hauled by two horses driven by one man. There I saved another man's labor, and frankly speaking, hauling five mowers in mowing fairways was first done at Minekahda, so far as I know.

Still I was not satisfied. I said to my chairman, "I am getting tired of horses, and I want to get a tractor." I explained how a tractor could be used, if I could find one suited to the work, and I went down to Chicago to see if anybody had one I could get a scheme from. I saw one rig but it didn't suit me, and came back home. To my surprise I found the tractor I was looking for right in Minneapolis, built by the Toro Manufacturing Company.

The thing we had to study over was how to push instead of pull the mowers, and Mr. Brooks, my as-
sistant and I spent a good deal of time before we got the idea to work. The mowing outfit we have now holds a record for mowing the Minekahda course in twelve hours, and it is very hilly, as some of you readers know. I cut my course three times a week with one machine, and never cut on Saturday afternoons.

**Watering Fairways Great Advantage**

Mowing fairways is a most important part of the work on a golf course, but first you must get your grass. And then you must keep it. In times of drought that is not so easy. Years ago our fairways died out in the middle of summer, and were hard as a rock, but we’ve got on top of that difficulty now. The watering system shown in the picture is what we use, sometimes straight across the course, and sometimes in V shape. We move them from one part of the course to another with tractors. It takes the time of one man when we are operating these fairway sprinklers to attend to them. The grass on our fairways is thick as hair on a dog’s back, and wherever you land you will get a good lie with your ball. I call them perfect, and so do others who play over them.

**Protecting Greens Through Winter**

Up here at the North Pole we sometimes have a little trouble with grass killing out in spots on our greens. Our springs are very cold, and when we find these bad spots, some people say, “You have winter killing.” I do not call it that however. If someone had given it the name of “spring killing,” it would be more to the point. I have covered the greens through the winter with straw, sometimes with brush, and some years dressed them with compost in which there was a large percentage of sand. I believe the latter method is the best so far tried out, but next year I shall try clear sand. I carried out quite a few pails of water, little by little, until I had ice on part of a green a foot thick. Then it thawed this spring, the piece of grass under the ice was just as fine as you would want to see it. This is the reason I do not call this trouble “winter killing.”

**Late Fall Watering of Greens**

It may be possible that my greens would stand up better during the winter if I did not water them so heavily in the fall. I have been soaking mine good, and also the bushes and trees. Have any of our members tried to have their greens good and dry when they go into the winter? I think this is a point that should be taken up by greenkeepers all through the northern states, how to bring greens through the winter in proper shape. Let’s hear from some of you boys.

**Applying Chemicals in Liquid Form**

I have done lots of experimenting to reduce cost of upkeep. I remember years ago Donald Ross was up here and told me to use nitrate of soda in liquid form to bring the grass along. I mixed up a batch and started putting it on the greens with a sprinkling can, but we got tired of that system. I then went down and bought a force pump, which improved matters, but it was a labor killer. It took four men and a team of horses, and it was very hard forcing that solution through a small hose. I said to myself, “Can’t I make something that will do this work easier?” I went to work in the machine shop and thought I had made something practical. I was very proud of it, but it proved to be worthless. However, I did not give up, and now we have something that we do not have to pump. We just turn on the water, hold the hose and the solution is evenly spread. A good many are using sulphate of ammonia mixed with compost. I always use it in liquid form, and I never top dress my greens more than three times in a season. Here at Minekahda the grass on the greens is so thick and heavy we have a hard time to rub it in.

**Association Serves Distant Members**

In closing this article I want to express my deep appreciation of what Mr. Morley and the other officers of the National Association of Greenkeepers of America are doing for greenkeepers everywhere. No matter how far off a man is, he has something to fall back upon when he sends his problems to the Association. For the older greenkeeper, it is certainly something to tie to, and for the young man who wants to get ahead, it serves as a rudder to steer his ship into the right port. All aboard!
From The Viewpoint Of Local Associations
What District Associations of Greenkeepers are Doing

Metropolitan District and Westchester County Stages Equipment Show
(Reported by Captain David L. Rees, President Metropolitan Association of Greenkeepers)

The Green Section of the Westchester County Golf Association held its first meeting of the year at the Grassy Sprain Golf Club, Bronxville, New York, on June 9, where a program of unusual interest was staged.

The Green committee chairmen of all Westchester clubs were invited, along with their greenkeepers, to play a round of golf in the morning. From 9 A.M. until 6 P.M. there was an exhibition on the lawn facing the clubhouse, and samples of every conceivable item of golf equipment and golf supplies were shown by close on forty dealers and manufacturers.

First in line came the very complete display of the Stumpp & Walter Company, showing everything from a rotary soil screen to glazed china tee balls.

Second came E. L. Winn, Inc., of Elizabeth, New Jersey, who featured equipment manufactured by Messrs. Pattison of England. An all brass putting cup and a proportioning machine of his own manufacture were notable items in his display.

Followed the display table of the Four-Seasons Fertilizer Company, claiming for their product that it has the virtue of retaining moisture and of ultimate reversion to humus in the soil.

The Bayer Company was on hand with Uspulun and Nu-Green, for use in preventing, restoring and curing the dreaded brown-patch.

So on down the line until we came to the tractors and grass cutting equipment. Following is a complete list of exhibitors:

List of Exhibitors

American Agricultural Chemical Company, New York City.
American Chemical Specialties Company, Springfield, N. J.
American Cyanamid Company, New York City.
Bayer Company, Inc., Rensselaer, N. Y.
Doughten Seed Company, Jersey City, N. J.
E. L. du Pont de Nemours & Co., Inc., Wilmington, Del.
E. L. Winn, Inc., Elizabeth, N. J.
F. & N. Lawn Mower Company, Richmond, Ind.
Ford Motor Company, Detroit, Mich.
Four Seasons Fertilizer Company, New York City.
G. B. Lewis Company, Watertown, Wis.
H. M. Hirschfield, Brooklyn, N. Y.
International Harvester Company, Chicago, Ill.
Jacobsen Manufacturing Company, Racine, Wis.
J. Daniels, New York City.
J. W. Buckley Rubber Company, New York City.
M. J. Knipfing & Sons, Westbury, L. I.
Mallinckrodt Chemical Works, St. Louis, Mo.
Milbradt Manufacturing Company, St. Louis, Mo.
Moto Mower Company, Detroit, Mich.
Pedigree Seed Company, New York City.
Peter Henderson & Company, New York City.
Rex Souvenir House, Montclair, N. J.
Roseman Tractor Mower Co., Evanston, Ill.
S. P. Townsend Company, Bloomfield, N. J.
Skinner Irrigation Company, Troy, Ohio.
Stumpp & Walter Company, New York City.
Virginia-Carolina Chemical Corp., Richmond, Va.
Whitehead & Kales Company, Detroit, Mich.
Worthington Mower Company, Stroudsburg, Pa.

At 2 P.M. there began an intensely interesting series of demonstrations, and greenkeepers were most keen in following every one. The different makes of grass cutting machines moved side by side, cutting as they went, thus offering excellent scope for comparison. Detail of demonstrations were as follows:

Program of Demonstrations

<table>
<thead>
<tr>
<th>Time</th>
<th>Description</th>
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<tbody>
<tr>
<td>2:00 P.M.</td>
<td>Tractors and Fairway Units</td>
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<tr>
<td>3:00 P.M.</td>
<td>Compost Machines</td>
</tr>
<tr>
<td>3:30 P.M.</td>
<td>Power Mowers</td>
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<tr>
<td>4:10 P.M.</td>
<td>Greens Mowers</td>
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<tr>
<td>5:00 P.M.</td>
<td>Greens Sweepers</td>
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<tr>
<td>5:15 P.M.</td>
<td>Sprinklers</td>
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<tr>
<td>5:45 P.M.</td>
<td>Worm Eradicators</td>
</tr>
</tbody>
</table>

Types of Products Shown in Order of Program Above

Royer, S. & W. Rotary
Biltmore, Ideal, Pennsylvania, Philadelphia, Townsend
Ideal, Jacobsen, Milbradt, Moto Mower
MacGregor
Pennsylvania, S. & W., Springfield
Allen, Dayton, Double Rotary, Elwin, Lark, Pelican, Skinner

American Agricultural Chemical, Bichloride Mowrah Meal, Readie Electric

At 7 P.M. Green committee chairmen and greenkeepers were invited to attend the dinner and meeting of the Association. The guest of the evening was Dr. John Monteith, Jr., of the U. S. G. A. Green Section. By general desire, Dr. Monteith, in preference to making a speech on brown-patch, was prepared to answer all questions put to him on this vital subject. A most interesting discussion was maintained throughout the evening. Dr. Monteith showed cultures of the fungi caus-