



NEWS LETTER

◆ ◆ ◆ ◆

“I would rather be able to appreciate things I cannot have than to have things I am not able to appreciate.”

◆ ◆ ◆ ◆

JULY
1940

This NEWSLETTER is published monthly by the Greenkeepers Club of New England, and sent free to its members and their Green's Chairmen. Subscription price ten cents a copy, or a dollar a year.

GUY C. WEST Editor

64 Prospect St., West Barrington, R. I.

GEORGE J. ROMMELL, JR.

Business Mgr.

54 Eddy St., West Newton, Mass.

July, 1940

Vol. 12, No. 7

Contributing Editors

Homer Darling R. A. Mitchell
Howard Farrant Charles Parker
 Frank Wilson

The ideas and opinions expressed in the subject matter of this NEWSLETTER are not necessarily those of the Editor or the members of the club as a whole.

TOP DRESSING METHODS AT THE PONKAPOAG GOLF COURSE

By Sam Mitchell

We are fortunate here at the Ponka-poag Golf Course in having about an acre of land that is available to use as a compost field. To this field we have added native peat, rotted leaves, stable manure as top dressings and have grown a crop of buckwheat each spring and a crop of winter rye in the fall which were plowed under. We added whatever fertilizer and lime was necessary to grow the cover crop. We also haul in each year the same amount of loam as was stripped over. We figure to strip from one-third of the area so that any one area is stripped only once in three years.

The loam is taken off about four to six inches deep in July or August when it is dust dry and run through a Royer Compost machine which at the same time throws it into our storage house. This removes the most of the heavy debris and large stone.

About a week before each topdressing, we screen a batch of this material through our double rotary screen which is $\frac{1}{2}$ " mesh on the inner screen and $\frac{1}{8}$ " mesh on the outer screen. After a

truck is loaded in the Royer Shed we add to the load fertilizer, lead or other materials desired to add to the mixture to go on the green with that topdressing. The rotary screen does a perfect job of mixing in the fertilizer, etc. without any extra labor. This double rotary screen and the Royer are both operated by a 2 H. P. slow speed electric motor.

We are now ready for the actual topdressing. The greens are usually cut the day before. Two men pole the greens to help dry them off. One Overgreen goes out with the Buell Spiker to spike ahead of the dressing. We have two trucks haul out from the shed and dump a load on each green. The drivers are pretty clever about the size for each green and usually hit it about right. Occasionally we have some dressing left to pick up.

Spreading is done with two Root Spreaders, two men to a spreader but only one spreader to a green. We start to spread at 8 A. M. By 9.30 the material is dry enough to work in. The second Overgreen has a long broom attached to the rear. This broom is made up of five street push brooms bolted to a bar. This tool will cover an average green in about ten minutes and put the fine material out of sight. By this time the two men are in from poling and they start to hand water each green. They put on all the water the green will take with a rose nozzle but not enough to let the water run. This settles the dressing down so that we are able to put on our regular greens sprinklers that night if necessary without any danger of washing the dressing around.

This method of dressing means an extra screening but we eliminate all the labor of hand mixing in of our fertilizer. It means we are able to clean up the whole dressing job in one day and so do not have the course tied up only the minimum amount. We do the eighteen greens, two practice greens, and four nurseries in one day.

In order to operate this program successfully, it is necessary to have the loam dust dry when housed with the Royer. By having it in a field it is reasonably easy to dry it out with a double disk harrow which would not be possible in a compost pile. I think the Overgreen with the brush on the back is the biggest labor saving device in the whole job. One man does more now than we used to do with four men with drag mats and does a better job.

FARM AND HOME WEEK
MASSACHUSETTS STATE COLLEGE
LAWN PROGRAM
Stockbridge Hall, Room 20

FRIDAY, JULY 26

- 10.00 a. m. Introduction to the Day's Program L. S. Dickinson
 Special Lawn Problem Questions submitted by visitors
- 10.30 a. m. Lawn Soils, Grasses, Diseases and Insects
F. V. Grau, L. S. Dickinson
- 12.00 m. Consideration of Special Lawn Problems (previously submitted)
F. V. Grau, L. S. Dickinson
- 12.30 p. m. Luncheon at College Cafeteria
- 2.00 p. m. Special Lawn Problem Questions submitted by visitors
L. S. Dickinson
- 2.30 p. m. Lawn Fertilizers, Weeds and Maintenance
F. V. Grau, L. S. Dickinson
- 3.30 p. m. Consideration of Special Lawn Problems (previously submitted)
F. V. Grau, L. S. Dickinson
- 4.00 p. m. Summary of Lawn Program L. S. Dickinson

Who's Who on the Program

Dickinson, Lawrence S., Assistant Professor of Agrostology, M.S.C.
 Grau, Fred V., Extension Agronomist, Pennsylvania State College, State
 College, Penn.

**MCBRIDE, REED SHANAHAN
 MEMORIAL WINNERS**

William J. McBride successfully defended his crown in the annual John Shanahan memorial golf tournament of greenkeepers and pros at Brae Burn on July 8th, when with Elmer Reed, former assistant pro at Brae Burn and now with McBride, and representing Nashua, N. H., they turned in a net 69. Best gross figures were marked up by the Lexington pair, Alex Ohlson and Cal Peterson, with a 77. Last year McBride won with Guy Paulson.

The scores:

W. J. McBride and Elmer Reed, Nashua, N. H., 80—69; Tom Mattus and John Sheehan, Albemarle, 81—72; Alex Ohlson and Cal Peterson, Lexington, 77—73; E. Palhamus and Steve Sincuk, Charles River, 85—73; A. M. Barney and Harry Pezzullo, Wampanoag, 82—73; Phil Cassidy and George Ford, Needham, 79—73; Art Anderson and Roy Bronsdon, Brae Burn, 86—74; Jim McCormick and Roland Hancock, Mt. Hood, 80—74; Ted Sanson and George Apple, Bear Hill, 79—74; Simy Braid and Bill Cosgrove, Grand View, 86—74; M. O'Grady and John Gilholm, New Bedford, 85—75.

**MEMBERS IN GOOD STANDING
 July 15, 1940**

Lloyd G. Stott	M. D. Maxwell
C. T. O'Keefe	W. F. Lerner
Edwin Hanson	Maurice Ryan
John Latvis	Guilford R. Johnson
H. D. Farrant	H. C. Darling
A. E. Anderson	Arthur Fontaine
P. G. Wanberg	N. J. Sperandio
George Volmer	James McCormack
T. F. Clarke	P. F. Hayden
Valentine Flood	Nicholas Bruno
Albert Scott	Joseph Oldfield
Everett Capello	Everett J. Pyle
J. L. Counsell	E. A. Polhamus
Edward Murphy	H. E. Cottelle
Ralph Thomas	Stephen Hannon
Alex Ohlson	Oscar Chapman
Franklin Hammond	Harold Mosher
Louis Marratto	P. I. Cassidy
R. A. Mitchell	Francis Tuscner
F. H. Wilson	S. S. Mitchell
R. W. Peckham	Roland Robinson
G. J. Rommell	A. Sperandio
Geno Pettazoni	Elmer Fuller
Simeone Braio	A. M. Barney
Edward Ohlson	James Sullivan
T. T. Mattus	Edward Buecher
Eugene Mauro	T. P. Anderson
Thomas O'Leary	M. J. O'Grady
R. W. Mansfield	

Frank H. Wilson, Treas.

THE RELATIVE PERMANENT TOXICITY OF INSECTICIDES, FUNGICIDES AND WEEDICIDES

Walter S. Eisenmenger
(A. G. S. A. Conference Paper)

The question of toxicity of elements is a relative one. All elements when present alone in a water solution with plant tissue are poison to the plant, but if some of the elements as compounds are mixed, the toxicity is decreased or entirely overcome. Thus sodium nitrate, calcium nitrate, magnesium sulphate when each is used separately are in water solution and even very dilute are toxic to plants, but if they are mixed together each compound overcomes the toxicity of the other. This is not all of the story for the soil contains not only a water solution but varying sized particles of rock. Some of these particles are large and quite unreactive. We have what the soil people call coarse sand and, if infinitely small, they are called clay. Any element which is called toxic is less toxic by far when added to clay than when added to sand, for the clay has many thousands more of surface than the same volume or weight of sand. The poisons are absorbed or stick to the outer surface of soil particles and are rendered in this way harmless or inert toward plant life. This is of intrinsic importance, for all applications of chemicals are less reactive on so-called heavy soils than on light soils. The writer has recollection of an instance where the toxicity of a given copper sulphate solution was sixty times as toxic in sand as in a loam soil, and records in England have instances where copper solutions were more than two hundred times as toxic in sand as in clay.

Now another factor which governs the toxic quality in soil is a chemical one, and this too is more pronounced in effect in loam and clay than in sand. Let us illustrate. In one of Defoe's stories relating men isolated on an island without recourse to drinking water resorted to the procedure of pouring sea water through successive layers of soil and finally were able by the filtering process of securing some water to drink. This could have been a physical or chemical process, but let us dwell on the chemical and take a copper sulphate or blue stone solution and run it through clay in quantities. If we would collect what was a blue solution,

we would find now a filtered material which was no longer blue but like pure water. Part of the copper sulphate, namely the copper, was held by the clay, and sulphate part went through with the water and was clear. Now many of nature's soils are admirably adjusted for this so-called base exchange and what you add to the soil after it has reacted is no longer what it was when it was applied. In the above instance the copper had combined with a part of the soil and become an insoluble copper compound, and what is present and insoluble is the same as not being present at all. This is important, for some elements as copper, lead and mercury in the soil have a decided tendency to form insoluble materials which given a little time never again become soluble unless work is done upon them and nature does not do this; only miners and smelters resort to this.

Poisons have been classified in toxicology. Some of them in the animal body affect the nervous system, others the heart muscles, the skin, the kidneys, the contraction of arteries and the like, while others, more inclusive in action, impair any living tissue whether plant or animal. They are called protoplasmic poisons. These poisons are those such as mercury, copper, arsenic—in fact all the so-called heavy metal salts which are soluble. Their action is to coagulate or stiffen the protein with which they come in contact. Nature has borne kindly with the plant, for both the soil, the plant and animal body, are to degree successful in making these harmless. In the animal the liver attempts to have them combine with something else to make them less harmful for the kidneys. The plant also tries to keep them out of the plant body by rejecting them or making them less soluble if they do get into the plant. The soil is the most admirably adapted medium to detoxifying these, for it is a system par excellence in making a soluble substance as mercuric chloride, lead arsenate or copper sulphate to an insoluble or inert form and, as before stated, an insoluble form is the same as if none were present as far as toxicity is concerned. This is illustrated by the fact that where nature is at work making elements insoluble, we observe that plants do grow in areas where copper, lead and mercury are mined. Man does something to them before they harm plants, and when they get to the soil for a time they go back to the form meant for them in the soil. If they remained soluble they would not

:

Your advertising message will

reach the men who buy

if you

Advertise in the

— NEWSLETTER —

Write the Business Manager

for rates.

:

Velvet Bent Sod

250,000 sq. ft. Kernwood

10,000 sq. ft. Piper

at putting green length

100% Weed Free

Matured Sod, strips 1' x 4'

Delivered prices upon request

William Mitchell

TURF GARDENS

New London

New Hampshire

Plan Fall Seeding Requirements Now

Call on the Woodruff representative. Get the benefit of the experience his organization brings you. Put to work Woodruff's unique acquaintanceship with New England climate and soils. Have a special mixture developed for your own particular requirements. In addition to supplying the largest quantities of native, New England grass seed, Woodruff continually experiments with turf improvements, offers rare and new varieties for unusual conditions. Get in touch with a Woodruff representative today.

Distributed by
New England Toro Company and
Connecticut Toro Company



BENT GRASS SEED

Piper Strain

Velvet Bent

Native Grown

Rhode Island

Bent

ALSO FAIRWAY
MIXTURES

Purchase with confidence,
direct from the grower,
viable, winter hardy seed,
at lowest price commensu-
rate with highest quality.

A. N. PECKHAM
KINGSTON, RHODE ISLAND

be there, for water would have washed them out. It is of great importance to remember that man-made chemicals are the ones which have a capacity to produce bad effects on living tissue.

Let us proceed with the mercury compounds adopted by men interested in plants for the purpose primarily in destroying fungi. Calomel which is quite insoluble, but soluble enough to destroy some bacteria of the colon of the human and fungi of soils, is not in low doses or applications toxic to animals and seed plants, and only by abnormal treatment would it be changed to bichloride of mercury in the colon, plant, or soil. It is the safer of the two mercury compounds used on plants.

When we apply bichloride of mercury to the soil in any appreciable quantities, it kills all living tissue and, if this is sandy soil, the results will be more pronounced, but will probably change to a harmless character equally as soon. But this compound is changed by soil and organic matter soon, for if protein of vegetation decomposes, enough sulphur compounds are formed to form the Cinnabar, the mercury compound that was mined from the soil originally and is insoluble. Also the protein of plants which were killed will combine with the mercury, in the same way that people mount a herbarium, wood and stuffed animals with bichloride of mercury. Mercury is not likely to hurt plants by acting as a cumulative poison in the soil; it may retard growth by destroying helpful bacteria after the time has elapsed for them to have the capacity to kill the seed plant, but this too is transient. Time will overcome this also.

Red oxide of copper is used instead of bordeaux mixture for the claim by many that it will not exert the immediate toxicity that will be exerted by bordeaux. It is harmless because of its apparent insolubility, nor will it become more soluble. The solubility is so low that it cannot be measured in water, yet the infinitely small solubility enables men to use it for soil disinfectant, and yet realize on the land a growth of seed plants. Many of the lower forms of plant life, bacteria and fungi are far more sensitive than the higher plants to the exceedingly small amounts in soil.

Copper sulphate is difficult to use as such, for it is an acid salt which will burn the leaves of plants out of proportion to the amount of good the copper in the salt will do, unless one cares nothing for what seed plants are

present. Bordeaux mixture which is in itself a series of compounds made by mixing copper sulphate and lime is one of the more common of sprays, yet probably less on greens than formerly. It is the writer's experience that a grower of potatoes used the equivalent of one carload of copper sulphate per annum on forty acres of land in the form of bordeaux and for a series of years, yet no diminution of yield was noted; in fact, an increase of yield resulted.

The reason for this was that the alkaline character of the lime and the calcium of the lime both acted against poisons, and what was not immediately a poison never became one. The copper for the most part stayed in the soil, yet it never hurt plants. This is not to mean that low lime bordeaux will not harm vegetation at the beginning. This is the one almost universal spray material to destroy fungi, and in modern agriculture we would do little without it where certain crops are involved. The peculiar character of this spray is the fact that the lime added to the soil is quite rapidly washed out of the soil and copper far more slowly. No better evidence for lack of cumulative effects of copper could be afforded.

Lead when added to plants in the form of arsenate of lead has been mentioned as a possible form of cumulative poison. What poisoning effect lead may have on the leaf tissue is immediate, for lead of all the elements used reverts soon in soil to an extremely insoluble compound. The things that may combine with lead in the soil, as sulphur or sulphate and carbon dioxide, form compounds which are identical to the ore from which we get lead and are insoluble and consequently relatively harmless. It may be asked, why do some of the elements which are in seemingly insoluble combination kill insects if they do not hurt plants. Not all insects are destroyed, depending upon the pH of their alimentary tract. Those which have a rather low pH may convert in their digestive tract what was entirely an insoluble salt to a slightly soluble one and be poisoned. Lead sulphate is insoluble, and formed in the soil and insects may get it into their bodies, but unless they die from a stagnated gut or change the solubility, they will not die from the poison. Acids convert many relatively insoluble compounds to slightly soluble compounds and make them more soluble. This is true with respect to lead arsenate. Calcium arsenate, when applied is

Just Think Of It

SPECIAL SEMESAN



Treats turf for only 21 cents per 1,000 sq. ft. Costs as little as \$1.25 a pound. Special Semesan contains both chlorophenol and cresol mercury for quick, long-lasting effect against brown patch and dollar spot, yet costs one-half to two-thirds less than inorganic and gives greater effective coverage. Applied in solution or dry with compost or the McClain Hydro-lizer by gaging and cutting down the water to a minimum. Write for free Turf Disease Pamphlet.

Special Semesan—

5 lbs. \$7.00
25 lbs. \$32.50
100 lbs. \$125.00

Nu Green—

5 lbs. \$6.25
25 lbs. \$28.75
100 lbs. \$110.00

BRECK'S

85 STATE STREET, BOSTON, MASS.

Tested Seeds, Florida Humus and V. C. Fairway Fertilizer

more soluble and may cause immediate harmful effects on plants. It does not have to be acted upon by the gastric or intestinal juices to be effective. In this case arsenic acts alone on the insect. When lead is present, both lead and arsenic act individually but the insect must do something to the compound.

Now that enough has been said of the elements which the soil content has rendered harmless, let us consider another class of elements—those if you please which the periodic table in chemistry places in a position suggesting different properties—the elements arsenic selenium and thallium. Here the evidence of lack of accumulation is not so pronounced. Let us first consider arsenic. In our own greenhouse the effect of arsenic has not been pronounced. For two hundred parts per million of arsenic trioxide we if anything experienced stimulation for barley and buckwheat showed no signs of toxicity when one thousand parts per million were added, but at this concentration showed some lack of chlorophyll, narrow leaves and apparent lack of transpiration. This was a loam soil. According to the results of nearly all experiments, the concept of Nagli enunciated more than

seventy-five years ago holds: it is this, that when an element exerts toxicity to a plant in measurable quantities, infinitely small amounts of this element will stimulate that plant. This seems to be the case in most instances. Our data shows this as does that of Greaves of Utah, as well as the workers in Oregon. On a loam or clay in our area two hundred parts per million of arsenious oxide did a service rather than a harm. Harm has been reported, however, by the Montana Station, the Washington Station and South Carolina. At South Carolina where vast amounts of arsenates are used on cotton for boll weevil there was apparently a decided influence deleteriously to some other crops and the germination of seeds. At Washington an old orchard that had been heavily sprayed for about twenty-five years, and then removed, showed soil which was deleterious to the growth of some plants, especially alfalfa. You, greens men, are somewhat fortunate for grasses, including cereals, are the most resistant to arsenic poisoning of numerous plants. Arsenic compounds are not readily changed to an entirely insoluble form by acids or bases. In either case they will still be soluble.

If any of you have perchance lived in an area of our country where a smelter has been working on the old basis—where all the fumes pass off the stack—you will have noticed on the hillsides dead vegetation or none at all. The initial cause of this phenomenon is the sulphur dioxide which comes from the stacks, but arsenic is always associated naturally with sulphides and it too comes off the stack. The sulphur compounds kill the green materials, but the fact that no vegetation comes soon afterward is claimed to be arsenic. Today with new apparatus they precipitate both the sulphur and arsenic, and sell their products, and little damage is done. Where by accident or otherwise too much arsenical is placed upon a soil, liming the soil will, to a great degree, overcome this bad effect.

There is a great difference of opinion about the actual harmful effects of arsenicals but unless continuous use in a lavish manner is made, it seems a doubtful factor in green culture. Some may claim that much is harmful, but more likely it is something else doing the harm. But it is an element which by careless use may in extreme cases come to contribute harm. It has those unique properties as an element in its reactions. Like selenium it will react with acid or base readily, and in each instance not become extremely insoluble. Of the two salts sodium arsenate or sodium arsenite, the latter is the more soluble and consequently more toxic, and will burn plants more quickly. This applies to immediate effects. Arsenic pentoxide is more active than arsenious oxide. The former is more soluble than the latter by nearly one hundred times. The slower the action of these compounds, the longer will their desirable action be prolonged. Ammonium arsenate is soluble to a high degree, but will burn plants less than the corresponding sodium compound. But this does not mean that harm cannot be done by this compound as far as immediate effects are concerned. After all these arsenates and arsenites are in the soil they form the same type of compound by reactions with the particles. Therefore as far as permanent or cumulative effect is concerned, they are all in the same category.

Selenium is one of the most persistent poisons in soil, which is exceedingly harmful not to plants, but to animals which eat the plant. This trouble is not one encountered in humid areas, but in the West.

Sulphate of iron is used as a selective compound to kill certain plants, and yet does not seem to hurt others. It does not seem at moderate concentrations to hurt grass tissue, oats, bents, etc., but does to a degree certain of the Caryophyllaceae and Solanaceae families as chickweed and mustard. This effect is immediate and the iron sulphate immediately changes to an insoluble oxide of iron in the soil, and no permanent effects would ever accrue.

There are several compounds which in the manufactured state are in the solid phase, but their vapor pressure soon brings them into a gaseous phase, at least parts of them—cyanogas and carbon disulphide. First of all a novice who has no knowledge of the properties of these compounds should not handle them for they are dangerous. Cyanogas from a cyanide salt at infinitely low concentrations will kill any animal including man. If large quantities are liberated in a small greenhouse it will destroy the tender newly formed leaves of plants. If used it must be repeated for the incised infant types of insects are not attacked. No permanent effects are possible for its gas is easily dissipated into the air. Its use in warfare could not be employed for this reason. It is the most deadly of all gases. Carbon disulphide is a heavy gas and descends instead of rising—goes down into burrows and kills insects and rodents. It is not a deadly poison for plants or animals, but to a degree acts as an anaesthetic or intoxicant acts on the nervous system. It has no permanent effect on plant life. It too should be carefully handled for it is inflammable and mixtures with air are explosive. It will burst into flame only a little above the boiling point temperature of water.

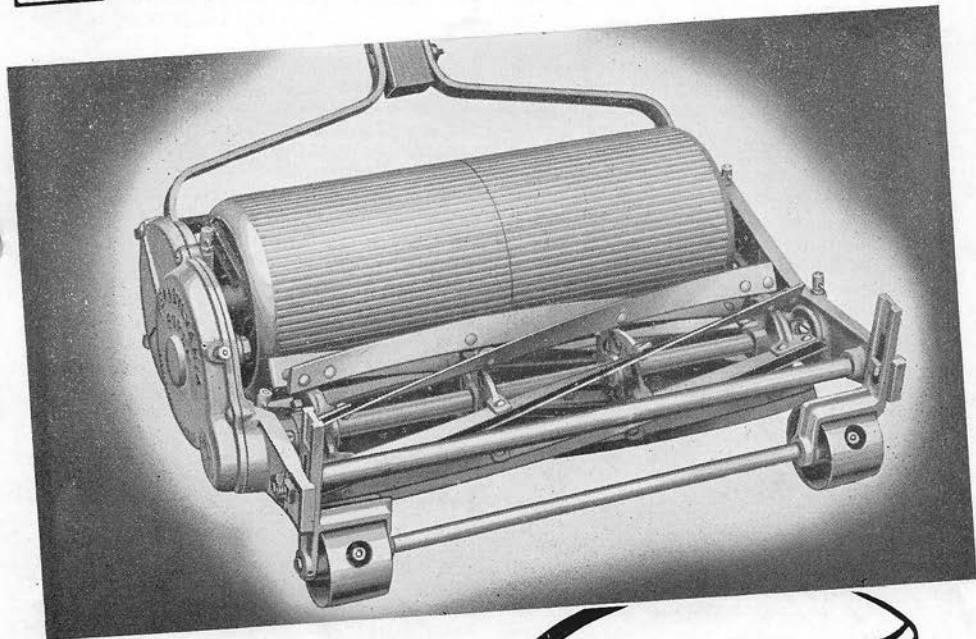
Of all weedicides, calcium, magnesium, potassium and sodium chlorate are the most inclusive in their harsh action toward vegetable life. They make no distinction between good and bad plants—all are killed. In immediate effect the sodium chlorate is the most active, next calcium, magnesium and then potassium. The results of these salts applied are not for a long time, for the reducing agencies of the soil change the chlorates to chlorides which may contribute to growth rather than retard vegetative growth.

One of the newer weedicides is ammonium thiocyanate. This performs a good service apparently, and leaves no permanent bad effects for any extended period.

YOUR BEST INSURANCE FOR



Championship Greens



Almost every championship golf course in the country keeps its greens in perfect condition with hand-pushed mowers. Many have proved by competitive tests that the Pennsylvania Super-Roller Greensmower is the finest machine of its kind. High speed ball-bearing cylinder with 8 blades of the finest crucible-analysis steel, oil-hardened and tempered, insures the smooth, ribless cut that is essential for a good putting surface. Train of 3 cut gears, running in grease in dust-tight case; assures an easy-pushing, fast-cutting mower. Castor wheels are mounted on hardened steel bushings with alemite lubrication. The light weight aluminum rollers, 7 inches in diameter, are interchangeable right or left. The width of cut is 18 inches.

We feel confident that careful comparison will convince any greenskeeper of the greater efficiency of this famous Pennsylvania mower and prove that here indeed is his best insurance for the maintenance of championship greens. Pennsylvania Lawn Mower Works, Primos, Del. County, Penna.

Pennsylvania

**SUPER-ROLLER
GREENSMOWER**

Send For Latest Catalog

Containing complete information on this and other Pennsylvania mowers for the golf course...including the DELUXE FAIRWAY GANG MOWERS. Units in both 30 and 36 inch sizes.

Pennsylvania
QUALITY LAWN MOWERS

JOHN J. NYHAN 120 Cypress Street, Brookline, Mass.
WOODWORTH BRADLEY, INC. 131 Dorrance Street, Providence, R. I.

"Water White Kerosene" will kill weeds and other vegetation. The killing process is not in this case as in others. This material shuts off the respiratory system of plants. They cannot exchange the gases oxygen for carbon dioxide and the reverse. If you would spill grease of any kind on a spot of the lawn, the grass would die. Dogs not too infrequently will drag greasy materials about a lawn and spots may be seen, caused by grease resulting in impaired grass growth. This material if from heavy oils may persist for a year or more, for bacteria are rare which break up the petroleum products, yet where derricks once were used in drilling for oil, vegetation again gets started and thrives.

Calcyanamid is toxic to all types of plant tissue but plants which have an underground rhizome are difficult to kill, for calcium cyanamid as we use it is insoluble in water, and by the time it gets into the soil to a great depth it is another substance. Two weeks after adding cyanamid on a spring or summer day, one may find crystals of urea resulting from the cyanamid; it is the initial decomposition product and may be found on the surface of the soil. It seems for this reason to be not too serviceable in killing quack grass. Other plants with root surface near the top of the soil have been killed by this chemical. No bad permanent effects are possible.

Chlorpicrin is an excellent weedicide if used in sufficient quantities and stimulates weeds if only a little is present. It may be a stimulant in the proper sense, but it contains nitrogen which too may serve for nutrition when the chemical decomposes. No permanent bad effects linger afterward.

Borax must be used with care. Fifteen parts per million are good. Often 100 parts per million will kill plant life. Lime added to fields to which too much borax has been added will help to restore normal growth. Too much borax may last for several years in effect on an acid soil. It is a risky compound to use as a weedicide, unless all is to be killed for some time.

There are several insecticides which are used, such as tobacco dust, nicotine sulphate, pyrethrum, rotenone and deris. With the exception of nicotine dust the others are especially toxic to cold-blooded animals, but not to man. They will kill only selectively. None of these leave any temporary or permanent injury to plant life.

As far as toxins to plants are concerned, they have inherited resistance and lack of resistance from their earlier forbearers. Those elements or compounds more frequently found in soil waters or even sea waters are the least toxic; thus the salts of calcium, magnesium, potassium and sodium in nature do not hurt plants, but the relatively rare salts of the elements copper, silver, gold, mercury and others are toxic for the fact that plants of today and their ancestors have never adjusted themselves to them for they were rare. Elements may be present but only slightly in solution and plants can tolerate only a little of them. Thus nearly eight per cent of the earth's crust is aluminum, and four and one-half per cent iron. They are, if soluble, destructive to plant life in appreciable concentrations but nature makes them in soil insoluble.

As a matter of digression, but to prevent tragedy or unhappiness, let us dwell finally on the case in the use of just a few of the killing chemicals. Have the mercury salts inclosed in a tight container and plainly labeled as to content. We do not regard even metallic mercury as having any great vapor pressure, yet history shows that in an inclosed room over a long time persons have been poisoned from the atmosphere surrounding the mercury. Cyanogas is deadly and the antidotes are of little avail. Take care about the least bit of this material. It is the author's experience that just about half of the human race can detect the odor of this gas.

For gastric poisoning for heavy metals as mercury and lead as well as arsenic, induce vomiting and administer white of an egg or milk. It is better never to have these chemicals near than to be careless with their use.

OFFICERS' DIRECTORY

President	John Counsell, 5 Ellsworth Rd., Peabody, Mass.
Secretary	Philip Cassidy, Needham Golf Club, Needham, Mass.
Treasurer	Frank Wilson, Charles River C. C., Newton Centre, Mass.
Chairman, Enter. Comm.	N. Sperandio, 90 Brinsmead St., Marlboro, Mass.
Chairman, Golf Comm.	Paul Hayden, 81 Orange St., Waltham, Mass.
Chairman, Welfare Comm.	Lloyd Stott, Meadowbrook G. C., Reading, Mass.
Chairman, Employ. Comm.	Arthur Anderson, 358 Fuller St., West Newton, Mass.
Chairman, Trustees	Paul C. Wanberg, 17 Eddy St., Waltham, Mass.

WORTHINGTON CUTTING UNITS give you improved playing conditions at lower mowing costs

Twenty-six years of research and practical operating experience have developed the 1940 Worthington Cutting Unit to the highest state of efficiency and operating economy. Gear housings are dust, sand and grease-proof. Filled to proper level they require checking only once during the season. There are no other places to grease or oil. Hand adjustment of the bed-knife steel is an exclusive Worthington feature—and the quickest of any cutting unit on the market—no tools required.

From the greenkeepers' and operators' viewpoints, there is less fussing

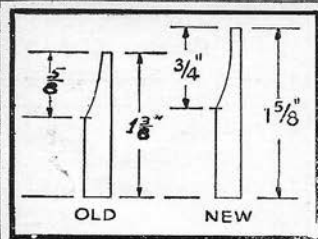
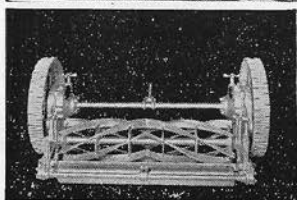
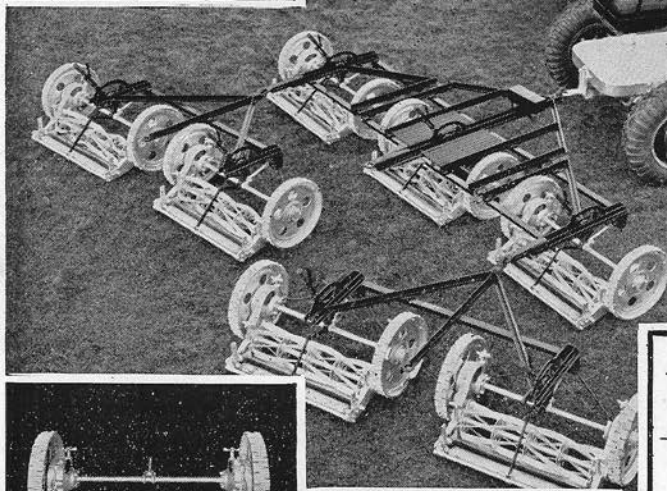
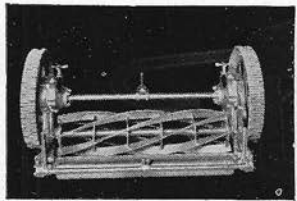
Below is the conventional spiral-type reel. Note sturdy demountable rims which, when worn or broken accidentally, can be replaced in a few moments at less than 1/2 the cost of a new wheel.

and trouble with Worthington Cutting Units and Gang Mowers. The general design is simplicity itself, its construction strong and sturdy to give years of service, and a beautiful cut under all conditions with a cutting range up to 4 inches. Its ground weight is 223 lbs.

Investigate the Worthington 1940 Cutting Unit before your mowing problem becomes acute this Spring, or write us today for complete data and specifications.

C. M. SAWTELLE
New England Distributor
3 Walker Terrace Cambridge, Mass.
Telephone: Trowbridge 7491

The Worthington Golf Chief and the Worthington Multi-gang with 7 cutting units, cutting a width of 16 feet is, we believe, the fastest, most flexible, most efficient and economical gang-mowing outfit in the world.



Above is the patented "V" or herringbone reel preferred by many golf course superintendents. Note—rubber pneumatic tires are available as extra equipment.

Worthington
Mower Company

STROUDSBURG • PENNSYLVANIA
Sales Agencies: All Principal Cities

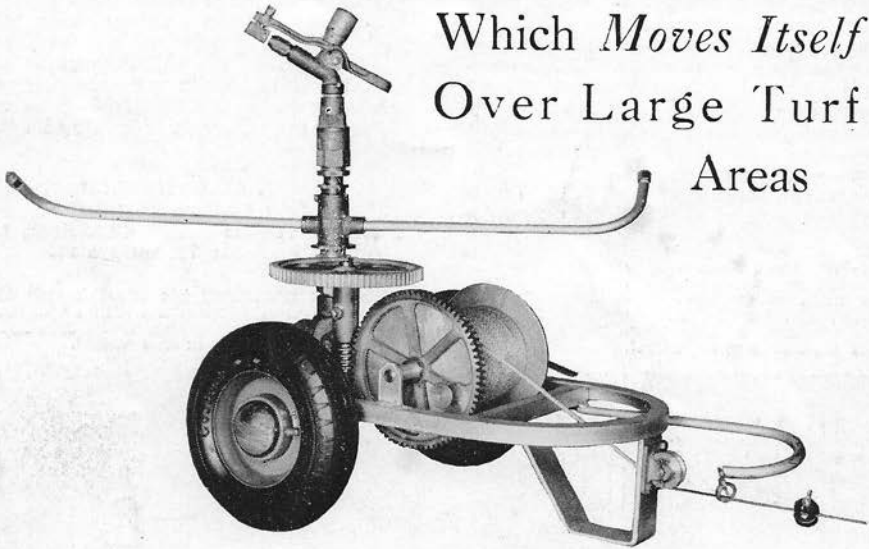
Note size of new fly-knife steel section above. It is a special heat-treated, oil-tempered alloy steel with a minimum Rockwell hardness of 40-c, allowing for greater wear and greatly lengthening the life of the reel.

Buckner RainMobile

A Self-Propelled Sprinkling Vehicle

Which *Moves Itself*
Over Large Turf

Areas



NEW ENGLAND DISTRIBUTORS FOR



THE RELIABLE

ANT CONTROL

FOR GOLF GREENS AND LAWNS

NO BUYING RISK: SELECT YOUR PACKING

Country Club Size: Twelve Large BUCKEYE Antubes with Four Dropper attachments. Delivered for 9.25. Use one. If not entirely satisfied return balance and owe nothing. Enough to make 6000 drop applications.

Bulk Quart Packing: Complete with Patent Dropper Gun. Both sent delivered for \$10.00. Enough to make 10,000 drop applications.

—Look For The Blue Packages—

New England Toro Co.

DISTRIBUTORS FOR NEW ENGLAND

1121 Washington St., West Newton

WEST NEW, 1658