



NEWS LETTER

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"NO MAN WINS HIS GREATEST FAME IN THAT TO WHICH HE HAS GIVEN MOST OF HIS TIME; IT'S HIS SIDE ISSUE, THE THING HE DOES FOR RECREATION, HIS HEART'S PLAY-SPELL, THAT GIVES HIM IMMORTALITY."

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APRIL
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.

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April, 1940 Vol. 12, No. 4

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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.

APRIL MEETING

The April meeting was held at the Waltham Field Station on the afternoon of the 8th. At the business meeting, Albert Scott of the Trapelo Golf Club was elected to Associate Membership.

We were honored to have present Alex. Bryce of the Wilmington (Del.) C. C., Robert Pollack of the Llanerch C. C., Manoa, Pa., and Kent Bradley of Passaic Co. G. C., Paterson, N. J., all of whom gave short talks on reasons why they believed in a National Organization.

Dr. E. E. Evaul of Upper Darby, Penna., formerly of the N. J. Agri. Exp. Station gave an interesting talk, mostly on "Fertilizers". Dr. Evaul discussed why we should fertilize, what fertilizer, and how much, from the cost of plant food basis. He said in part: Do not depend on someone else for your thinking. The fertilizer problem for the greens will be different than that of the fairways, due to removal of clippings from greens. Before any program is drawn up, know the conditions which you are trying to change or create.

Rapid tests by themselves may lead into trouble; the interpretation of the tests is more important than the tests themselves. Use the rapid test as a guide, using representative samples. The

texture and organic matter content must also be considered.

Accomplished by fertilizer: healthy turf, a regular supply of plant nutrients, vigorous growth to combat weeds, also to combat drought.

The carriers of the elements are important in any complete fertilizer. Goodwill of individual and service rendered by a company may be important, but the unit of plant food is more important.

Do not use too much potash unless there is a deficiency, or to encourage clover.

Soluble salts, such as calcium, potash, nitrate nitrogen, will leach out of irrigated areas, hence more fertilization will be needed.

Any greenkeeping organization can do a lot to educate the public as to what they should expect on the course.

Another surprise speaker, who was very welcome, was Dr. John Monteith of the U. S. G. A. Green Section. Dr. Monteith gave the following table of the percentages of mercury in the compounds listed, which are used for disease control:

Oxide of mercury	92
Calomel	85
Corrosive sublimate	74
Fungol	33
Curex	20
Special Semesan	18
Semesan	17
NuGreen	11

In a discussion of high and low lime bordeaux, Dr. Monteith advised against using either on greens for brown patch control, as the evidence has been that there has been injury from copper poisoning in many cases. On certain soils copper injury does not show up, why isn't known, until we know why, bordeaux is dangerous to use on greens.

Even at present high prices of mercury, copper is more expensive, as it takes about a pound of bordeaux for control as much as an ounce of corrosive, it is more easily washed off, and it controls only large brown patch, while mercury will control snow mold, dollar spot and the large brown patch.

Where GK is uncertain, test strips on green and fairway are advised, using potash, phosphorus and lime. Keep clean cut record of where test plots are located. If better turf does not show up during year, there isn't a deficiency of the element tested.

SERVICE SECTION DINNER

The annual dinner meeting of the Greenkeepers Club of New England and the Service Section of the M. G. A. was held at the Charles River Country Club on the evening of the 8th. Chairman A. Oram Fulton as toastmaster called on the following as speakers: Pres. Al McIntire of the Charles River Country Club, Pres. Campbell-Patterson of the Mass. Golf Assoc., Pres. Harold Pierce of the U.S.G.A., Pres. John Counsell of the Greenkeepers Club, Robert Pollack, representing the G. S. A., Francis Ouimet, Dr. John Monteith, Dr. E. E. Evaul.

Dr. Evaul discussed the relationship between GK and green chairman. He said that any proposed changes must consider the playing membership. He advised the GK and chairman working together on analysis of problems and under long-time plans. The possible use of aerial photographs was discussed. The GK's job is to keep chairman advised as to details. The chairman should make some time available for GK to advise him as to details. Advertising might have its place; the members might be more sympathetic if they knew more about problems.

ROUND TABLE MEETINGS

(March 21, 1940)

Discussion of Turf Diseases and Use of Mercurials

Sam Mitchell, chairman

Letters were read from Prof. L. S. Dickinson of Massachusetts State College, Dr. De France and Dr. Erwin of Rhode Island State College and Dr. Longnecker of New Jersey Experiment Station on the subject.

In these letters it was generally pointed out that a greenkeeper could not expect to curtail his spray program to any great extent. It was suggested that one might wait for weather conditions favorable to an attack of disease and then spray, rather than to attempt periodic treatments for prevention.

No satisfactory substitute for mercurials known at the present time. Other methods of control suggested were "lime dusted over greens may keep down Brown Patch".

Healthy turf should be less susceptible and should recover better than weak turf.

The New England Toro Company furnished sample packages of various mercurial products for display.

A general discussion took place on the different materials and the cost per application of each.

Application methods were discussed.

(March 25, 1940)

Discussion of Individual Course Problems

Howard Farrant, chairman

Topics discussed were:—

Elimination of clover from greens.
Use of Tonagreen, sulphate of ammonia, plugging.

Elimination of low spots in putting green—lift sod and raise them, filling with extra topdressing not successful.

Fairy ring—cause and what to do about it—caused by a fungus disease—only remedy is to dig it out, remove it and renew soil.

Elimination of corrugation in fairways. Cross mowing, cross rolling, slower mowing if present mowing is at great enough speed to cause the trouble.

Eradication of crab grass. Discussion of the use of chemical weed killers.

Discussion of irrigation of putting greens.

Discussion of fertilization of velvet bent.

Alterations to fairway grade without putting the hole out of play.

Discussion of methods of lime application.

(March 28, 1940)

How To Establish A Bird Sanctuary On Your Golf Course

Homer Darling, chairman

The chairman introduced Mr. C. Russell Mason of Audubon Bird Society who spoke on the above subject.

Golf courses are natural bird sanctuaries. They have a variety of country, open spaces, wooded areas, generally no shooting allowed.

Bird life attracted to club house grounds will interest non-golfers.

Berry bearing shrubs will attract both insect eating and seed eating birds. These shrubs also add to the landscape.

Even though a golf course is a natural sanctuary it can be improved. Feeding stations will increase the number of the bird population and the variety.

In clearing woodlands nesting places are sacrificed. A substitute is needed for bird species that have this type of nesting. Put up bird houses.

Birds must also be supplied with water. If bird baths are put out, have them in the open so that hawks and cats will not have opportunities to prey on the birds.

Some tangle for shelter should be available.

Very interesting movies of the Moose Hill Bird Sanctuary were shown.

Business Management of a Green-keepers Job

Papers were read by:

John Counsell—Turf Records

Frank Wilson—Diary and

Record of Areas

George Rommell—Reports to
Committee

Records are a business like way of running your job. A way of selling yourself to your club. Removes a lot of the guess work. Other records kept might be of rainfall, temperature, weather, pH, etc.

Round table meeting committee,
Sam Mitchell, chairman
Homer Darling
Howard Farrant

WHAT ABOUT TOP DRESSING?

N. J. Sperandio

Marlborough Country Club
Marlborough, Mass.

The purposes of top dressing are to keep the turf in a healthy, growing condition, to create a true putting surface, and to provide sufficient resiliency for holding a pitched ball.

A desirable top dressing mixture is a sandy, loam soil, rich in organic matter, and the character of the mixture should remain constant for long periods. Such a mixture builds up a favorable top soil, which is beneficial, especially, where the natural soil is poor. Care should be taken as to the origin of materials used in top dressing. They should be tested for acidity, and, if found to be too acid, lime should be added. In some cases where peat, sand, or soil is taken from locations along the seacoast, the material is apt to contain sufficient salt to injure turf. The material should not be

taken from areas abounding in weeds. Many golf clubs introduce sufficient weeds in top dressing to keep crews of weeders busy all summer. The production of soil layers, turf mats, over-fertilization, smothering, weed infestation, unsuitable top dressing materials, and improper methods of application are to blame for much damage to turf.

Top dressing need not be rich in fertilizer since plant food can be applied more economically by direct application of fertilizer. A top dressing material often contains a large amount of fertilizer, such as decomposed manure or other similar materials. This fact is overlooked when preparing a fertilizing program, and as a result, over-fertilization may follow.

Changing the type of soil used in successive applications of top dressing has often been the cause of injury. When the mixture is not of a constant type, the formation of layers of sand, clay, and organic matter will result. Layers are also formed by burying thick mats of turf with heavy top dressings. Soil layers can sometimes be partially corrected by spiking and top dressing with suitable materials, although frequently it is found necessary to remove the sod entirely and mix the layers. In some cases top dressing is neglected in the summer with the result that, particularly with creeping bent turf, a thick mat of grass, leaves and stolons are formed. When this occurs, the mat should be removed before top dressing is applied. This can be accomplished by thoroughly brushing or raking, followed by close cutting. In case there is only a thin mat of turf, a light brushing and cutting may suffice. Brushes on mowers or stable brooms are often used for this purpose. Iron rakes, with sharp teeth, may be necessary for the thicker mats which should be successively raked and cut in several directions until the mat is removed. It may be necessary to repeat the process several times before top-dressing. To prevent the occurrence of a thick mat, particularly with creeping bent, turf should be raked and cut each time before it is top dressed; furthermore, it should be top dressed with sufficient frequency.

A general recommendation for fertilizing putting greens might be as follows:—

Well-prepared and weed-free compost, or mushroom soil to which sand

Velvet Bent Seed RARITAN and EMERALD

These improved strains are the finest of all turf grasses for golf greens and other closely cut turf

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OUR SEED TESTS HIGH

Purity—95%

Germination over 85%

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Velvet Bent Sod

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at putting green length

100% Weed Free

Matured Sod, strips 1' x 4'

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A. N. PECKHAM
KINGSTON, RHODE ISLAND

has been added, should be applied liberally to the greens at the beginning of the growing season. When compost prepared from a mixture of manure and soil is used, or, when mushroom soil is used, the top dressing will be of considerable fertilizing value.

One of the most important purposes of applying top dressing is to fill in slight depressions in the turf and, thereby, improve the putting surface. A sifted soil, preferably sandy loams, may be used for this purpose. If the top dressing has not been produced by composting the soil with various manures, it may be of comparatively small fertilizing value.

When a top dressing of natural soil, or soil mixed with sand or peat is used, a completely mixed fertilizer should also be used occasionally to provide the nitrogen and mineral elements such as phosphorus, potassium, calcium, and other elements, contained in manure. Although the elements will have to be applied only occasionally, it will be necessary to keep up the nitrogen supply—this is best done by making frequent light applications of some soluble nitrogenous fertilizer, such as sulphate of ammonia.

If the fertilizing is not being done by means of top dressing with compost or mushroom soil, only enough top dressing should be applied to keep the putting surface true throughout the playing season. Close cutting, brushing, raking, and even light rolling of putting greens, in many instances, tend to make frequent or heavy top dressing unnecessary.

An application of one cubic yard of top dressing at one time is ordinarily sufficient to true the surface of a putting green of 5,000 to 6,000 square feet. Often such a top dressing in the Spring and Fall is sufficient on some greens, while on others, several top dressings may have to be made during the season.

Top dressing during the playing season should be much lighter than in the Spring and Fall, in order to interfere as little as possible with play.

Top dressings should be worked in with a mat, or some device which will rub the material from the high spots and deposit it in the lower areas.

The amount of top dressing to apply will depend largely on the needs of the turf from the playing standpoint, and to less extent on the needs of the grass

for growth. When the putting surface is not true, top dressing should be applied. Frequent light applications are better for this purpose than infrequent heavy applications.

The cost of application must also be considered on many golf courses, and from the stand-point of cost, it is inadvisable to top dress more frequently than necessary. When large quantities of compost or mushroom soils are used on greens, they may in themselves add enough of the fertilizing elements to provide for adequate growth of grass. Good compost is, however, more costly than it was many years ago and, therefore, the use of compost is becoming more and more restricted to the actual need of providing a true putting surface. Commercial fertilizers, on the other hand, have been greatly reduced in cost as compared with compost in recent years and are, therefore, coming more and more into general use on golf courses.

It is, therefore, advisable to supplement the compost with sandy loam for making the putting surface true, and with fertilizers for providing the food necessary for the growth of the grass. For other purposes, the greenskeeper has available a large number of thoroughly tested commercial fertilizers. There has been, in the past, some prejudice against the use of commercial fertilizer on the part of many of those who have clung to the preference for so-called natural fertilizers. These were practically the only ones available at the time of our great-grandfathers. The modern farmers and greenskeepers have learned to recognize that plants are not influenced by prejudices, and are satisfied to get their food from any source that is available. The important question is the matter of availability, which means, as a rule, whether or not the plant food can become soluble in the soil and thus be in the proper condition for the roots to absorb.

“Whenever my wife needs money she calls me handsome.”

“Handsome?”

“Hand some over!”

—Ex.

“Can she keep a secret?”

“Yes, the mean thing!”

—Ex.

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LEWIS Tee Stake of 1" x 2" x 1/8" steel channel, 5 ft. long, with channel cross member at top. Finished in white weather-resisting paint. Price \$1.25.

Weight 8 lbs.

Top of Stake should be 25" to 30" above ground level.

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Brush without spring	.40
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Paddle with chain and screw	.55
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Chain for paddle	.15
Brush end spring	.03
Ban—25 lb. pail	4.50

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**THE HIGH COST OF GOLF SUPPLIES**

There seems to be a feeling on the part of some Golf Club Committee Chairmen and Greenkeepers that any item labelled "GOLF" carries a tariff higher than normal. This may be true in many instances, and a study as to reasons will show justification for these higher prices.

Golf as we look at it is a short-seasoned game—one that opens with a bang, carries on at top speed through some 20 weeks, and then closes like a trap door. Little activity takes place during the other 30 dormant weeks—at least to the eye of the non-committeeman and golfers as players.

It would be useless for me to set down all the things done by the greenkeeper in getting things ready for the next season. This is common knowledge among you, and few if any can get all these things done before April 19 rolls around again.

Your supplier of accessories, equipment, seed, fertilizers, and such allied items also works "far into the night" getting his data together for the coming season. For example, take grass

seed. In many cases, seeds are purchased in August for the following spring. The seed is usually paid for and stored until seeding time. Interest on investment, storage, insurance, and other contributing costs mount each succeeding month. Contracts are made for all other kinds of supplies, and in most cases spring orders are placed in November and December. In many instances delivery must be taken before the turn of the year in order that higher costs may be eliminated. Here again we have investment, insurance, storage, and sundry direct costs mounting with each month. And so it goes all down the line insofar as your dealer is concerned.

The manufacturer is also in a similar position in that he must manufacture all these specialty items during the fall and winter months, store and insure them, and gamble that he has made enough and yet not too many of each. The very nature of the items is such that most of them are wanted on short notice and at one time by the club trade. This throws a very heavy stock and delivery problem on the shoulders of the dealer in a very short span of time. If the dealer guessed wrong as to his probable sales and the manufacturer

made the same error, it causes long delays in delivery and exorbitant delivery or transportation charges.

Any business which must be highly seasonal will always be forced to pay higher prices for commodities on account of higher costs of manufacturing and distributing of these necessary items. However, there does exist a way and means of levelling off this extremely high price peak, but it is a cooperative step and cannot function with but one party taking action.

There does exist at the present time quite satisfactory cooperation between the manufacturers and dealers in that dealers buy as far ahead as possible, pay their bills promptly, and keep manufacturer advised as to the general buying trends. The next step in this cooperative action is for the club officials and greenkeepers to work more closely with their dealers.

This can be accomplished by greenkeepers placing their orders for spring and even many summer needs during those dormant winter months, and by doing this as soon as convenient after budgets have been approved. Doing this allows the dealer to spread his buying, storing, and delivery over a longer stretch of time and also ease his financial strain. Few dealers if any would object to delivery of supplies in January and February on terms allowing the club to make payments in April or May. This would mean that the dealer can lower his stocks on hand, spread out his delivery period, lower his insurance, and reorder as soon as deliveries lower his stock below the average minimum. In turn, this plan would allow the manufacturer to go through the same steps with his dealers.

Few if any golf equipment and supply dealers can finance their entire sales with their own capital. This means that all of us must at certain times hire money to pay our bills. As you know, manufacturers insist on their payment terms being met right on the due date or the dealer suffers the penalty of no further credit nor supplies. Now, under the "spread" plan, the dealer can use his accounts receivable as good loan collateral at any commercial bank which might refuse a loan on a high inventory of goods in stock. Banks want to loan money as it means income to them, but they cannot see the advisability of loaning money to a dealer for the purpose of buying stocks when the dealer is already

heavily stocked, and they fail to understand the high seasonal demands taking place in March and April. These loans would then be short-term loans and not 6 or 8 month loans as are now necessary under the present late buying and slow payment procedure.

The next step is that of closer cooperation between the Club Treasurer and the supply dealer. Whether this long space between the invoice date and payment date is due to low finances at the club or slow due payments or what-not, it works a decided hardship on the dealer.

Greenkeepers can sell their club officials on the idea that these dealers are entitled to their money within the terms of the sale, and by passing invoices through with payment requests, this can be speeded up considerably. Where the dealer makes a sale on a deferred payment plan or spring dating on early deliveries, he has quite a definite payment date in mind and can easily arrange his finances to meet these conditions. But, in cases of 2, 3, and often 6 months' delay in paying bills sold on a 30 days basis, the dealer has no idea as to when he may expect the remittance and cannot therefore arrange for the use of this money due him.

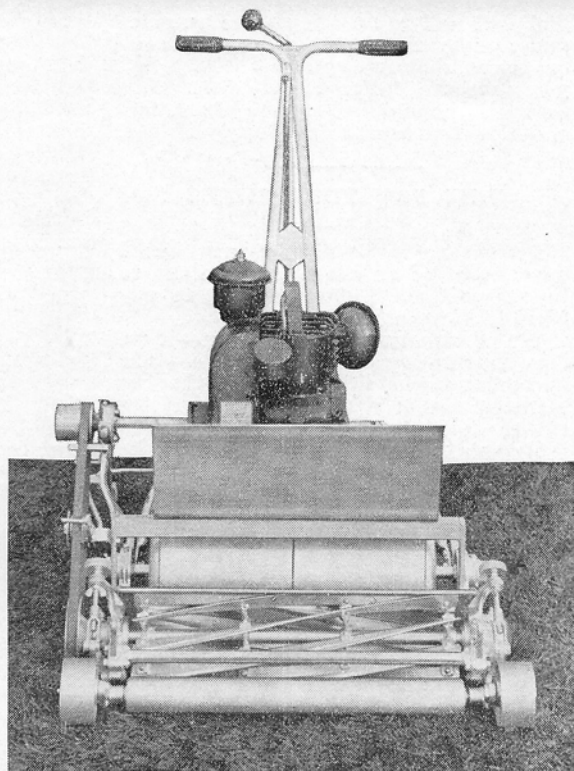
After all is said and done, your equipment and supply dealer is a legitimate merchant. He buys his merchandise, pays his bills, keeps an office, shop, delivery and sales department, all of which is necessary to properly serve you if, when, and as you require his services. This sets up a definite operating "fixed" cost which he must include in the pricing of his materials to the golf trade. Under the present "spring peak" loads, he must either absorb a very high short-period operating cost, or he must increase his selling price to cover these anticipated unusual expenses. This is a universal problem and not one existing with any one dealer nor within any one section of the country.

The opportunity exists for the New England section to see this picture and to do something about it. Cooperative buying did not solve this problem as this plan has been tried, and for the reason that it did not lessen the peak for the dealer.

It is my candid opinion that earlier buying, acceptance of earlier delivery, and earlier payments of bills on their due dates will lessen the load on the part of the dealers. They in turn will

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lessen the manufacturers' load, and in turn a saving will accumulate all down the line. The result will be that we can and will sell these very same supplies and equipment to the golf trade at lower prices than are possible today and yet leave the dealer a legitimate profit to which, none will deny, he is entitled.

—One Equipment and Supply Dealer.

WHY PAY YOUR BILLS?

I have never been in China, but I have heard of an adage in use there to the effect that "Debtors failing to pay their bills were juggled."

We of this modern civilization—if we can truthfully call it modern—take quite the opposite viewpoint in that we ostracize and look down on the creditor rather than the debtor. We seem to feel that it's the creditor's fault if he fails to look into credit references and ignores the signs of unpaid small bills. We think the businessman who fails up and fires his employees is one who is extremely unkind to his employees and overloads the W.P.A.

It would be a grand world if you, the other fellow, and I could just keep on buying and buying without ever thinking about paying our bills. It is perhaps fortunate for us that we do not have a Treasurer already burdened down with his own personal or business problems to whom we can refer our creditors. We have to face our own creditors, make our own excuses, or sign the checks. Perhaps it is this intimate knowledge of the size of the exchequer that holds our appetite down on a level with the pocketbook.

It has been my observation, based on many years in this golf industry, that the average Club Treasurer has accomplished almost miracles in meeting the hundreds of bills thrown at him just as he sits down for his weekly luncheon prior to the regular Saturday foursome.

It seems that the average Club Treasurer is that species of man who "gives and gives" without much taking. Just imagine how the end of the month would look at your home desk if every member of the family could and did buy whatever he or she desired without consultation with you. Can you imagine yourself in that predicament? Well, that's the Club Treasurer. If you don't believe me, just take the time out to ask him.

Every well-managed club today has some form of budget. According to

Funk & Wagnalls, "budget" is supposed to be, "Formerly, a small sack or its contents; a collection of news; financial estimate." I have never been sure if the Treasurer is the "sack" or the "contents in the bag." At any rate, the Treasurer should be present to make sure that all allotted appropriations are well within the normal expectant income. I believe his power should go further in that he be permitted from time to time to advise the various Committee Chairmen when income has fallen below the expectant figure in order that purchases may be deferred or curtailed. This simple process means no expenditures would be made of greater value than could be met with current income.

To suggest that the House, Tennis, Golf, Bridge, Swimming, Greens, or some other committee should have preference in budget allotment or expenditures would of course depend on the club and its trend. We can be sure though of one fact which is that the Greens Committee or Grounds Committee dealing with the actual maintenance of the golf course as a playing area should be somewhere near the top, for without Golf there might be no club. This committee must make certain definite commitments in the winter to make sure that materials are on hand for the opening of the course. These comprise a very large percentage of the expenditures authorized by that committee, exclusive of the daily labor which follows. The Treasurer should be notified of the necessity of these materials and be authorized to meet all bills properly approved by the Greenkeeper or the Greens Chairman within the agreed sales dates shown on these invoices.

Contrast the above suggestion with the more or less current procedure of paying the merchant who squawks the loudest, and letting the maintenance materials suppliers wait until the season is half or nearly over before coming to their turn on the list.

If neither of these two methods is followed, then it seems only good business that each Committee Chairman or other authorized buyer be notified as to the approximate date his contracts will be paid and allow him in turn to notify the supplier with whom he expects to deal. The dealer can then refuse to accept the contract or adjust his finances to meet it.

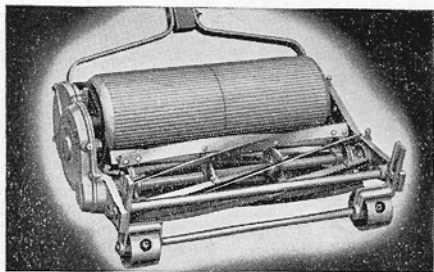
Keep Your Mowing Costs



IN BOUNDS

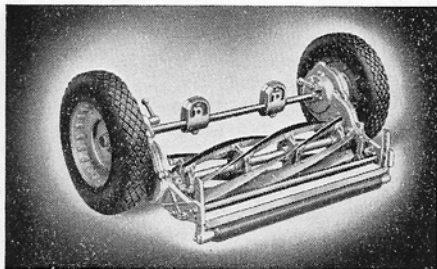
..with PENNSYLVANIA MOWERS

The sure way to keep your mowing costs at a minimum in 1940 and at the same time maintain the finest possible fairways and greens, is to start the season with the right equipment. Look over your mowers carefully. If they are old and worn, frequent repairs will waste time and money during the year, and they cannot be expected to do satisfactory work. If you decide to invest in NEW mowers, choose them with great care, not alone for their ability to do a good job THIS year but with an eye on their PROVED RECORD of dependable performance for MANY YEARS. We believe that the two Pennsylvanias described below will stand out in any careful comparison as the most efficient and economical mowers you can buy.



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Ball bearing, high speed 8-blade cylinder provides a smooth, ribless cut that insures a perfect putting surface. Blades are of the finest crucible analysis steel—oil hardened and tempered. Train of 3 cut gears, running in grease in dust-tight case, assures an easy-pushing, fast-cutting mower. Castor wheels are mounted in hardened steel bushing with alemite lubrication. Extra castor wheel for cutting sharply undulating greens. The light weight aluminum rollers, 7 inches in diameter, are interchangeable right or left.



PENNSYLVANIA DE LUXE FAIRWAY

Available in both 30 inch and 36 inch sizes. Unbreakable malleable iron construction. 6 heavy crucible analysis steel blades provide a smooth cut. Timken roller bearings on cylinder are adjustable, to take up wear. The raised edge lower blade is reversible. Train of machine-cut hardened gears on BOTH sides, protected by dust-proof, grease-retaining cases. Steel roller with hardened steel bearings. Pneumatic tires optional. 30-INCH MODEL K FAIRWAY is made of cast iron and offered at a lower price.

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Every year we see more clubs turning to The Chandler Act or 77B. None will deny that this step is not proper as many clubs are overloaded with taxes, interest, and other fixed obligations far out of proportion to their current income. The day of reckoning is just around the corner for many, but might be eliminated by operating on a strict economy plan.

Golf is passing out of that early "fly-by-night" stage and is settling down into a permanent business. As such it must be organized and operated as a going business. Club officials will of course change and committees will shift, but one good member on the previous committee usually makes an excellent Chairman. This permits a continuity between the club officials and the suppliers of commodities, thereby promoting a smoother working combination with less headaches as to what actually transpired during the previous year. It means a continuation of the employee-employer relationship harmony and assures a satisfactory employee a continuation of his job. Thus the employer is freed of that difficult task and problem of "breaking in" new men in the various departments.

No one man, in my opinion, is a better pivotman in a Club than the Treasurer. He should and usually stays on for several seasons, and as a tried and proved official, his experience should be well heeded. He collects your dues and acts as custodian and chief disbursement officer. If any man knows where the club is headed, it is the Treasurer. If any man knows whether you can afford this or that, it is the Treasurer. He is the man who will pay the bills contracted and, believe it or not, whether it be in China or the good old U. S. A., the man with the money bag should be a big factor.

—Just a Creditor.

THE FOUR PILLARS OF FERTILITY

(A Winter School for Greenkeepers Paper)

Due to different soil environments under which the greenkeeper works, his problem is more or less an individual one. There are, however, some general things he must consider. In this paper, I am outlining what I know to be the four pillars of soil fertility.

1. Presence in the soil of adequate amounts of available nitrogen, phosphorus, and potash.

2. Suitable physical soil conditions permitting drainage, soil aeration, root penetration and an even water supply.

3. A suitable soil reaction conveyed by a sufficiency of lime in the soil.

4. Presence of the indispensable soil micro-organisms, which ferment the humus or organic matter, cause nitrification, fixation of atmospheric nitrogen, etc.

These cardinal factors in soil fertility are intimately related. If one is deficient or lacking, the crop will suffer, no matter how favorably the remainder prevail.

First Pillar

Nitrogen. Other conditions being satisfactory, crop yields (except legumes) are closely proportioned to the amount of combined nitrogen they receive. It encourages leaf and stem growth. For this reason it is valuable as a topdressing to force early grass growth, but requires correct supplementing with phosphorus and potash to produce a balanced plant development.

Phosphorous has a remarkable effect in the development of root growth, and also establishes a good root growth in seedlings.

Potash is important in the formation of sugars and starches. It gives tone and vigor to the whole plant, making it less susceptible to diseases.

Second Pillar

Drainage, permitting suitable physical soil conditions, soil aeration, root penetration and an even water supply. This is the fundamental basis of sound agricultural practice. Optimum physical environment is determined by adequate drainage. It influences every single factor and operation concerned in grass production.

In the cases of poor drainage, expenditures on labor and seed and fertilizers are in most cases practically lost. Drained soils increase the quantity and quality of good grass crops, prevent water logging, winter killing, and render the fungus diseases so well known in the turf world practically harmless.

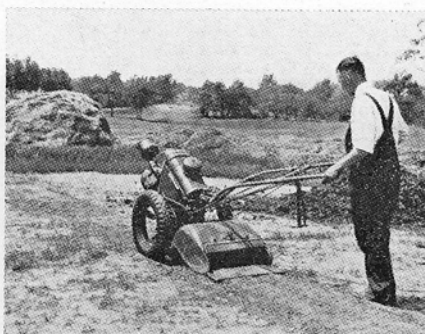
Good drainage also provides a much longer and more pleasant playing period.

Third Pillar

A suitable soil reaction conveyed by a sufficiency of lime in the soil. Lime neutralizes acidity and sweetens the soil. It is an essential element without which

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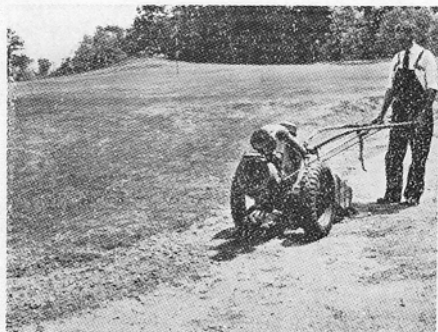
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plants cannot grow. In some soils a sufficiency of calcium exists for the actual nutrient requirements of the plant, but in other soils, lime must be added for good plant growth. With the application of lime, heavy soils are made more open and friable. Drainage is increased, the land is drier and warmer and a good tilth more readily secured. Baking and cracking in summer is much reduced.

Fourth Pillar

Micro-organisms—the teeming population of the soil.

Fermentation and decay, those profound scavenging operations in nature, which keep the earth sanitary and concurrently provide indispensable soluble plant food for crop nutrition are the resultant activity of the soil micro-organisms. Not all of the soil organisms are beneficial. Many are distinctly injurious to plant growth, and some are parasitic, causing disease.

The practical problem of the greenkeeper is to maintain soil conditions which are most favorable to the growth of the desirable types and to bear in mind the importance of soil organisms as an influence on soil fertility. All his cultural operations remarkably influence the number and kind of bacteria in the soil. Bad conditions upset the bacterial balance, encouraging injurious forms and suppressing desirable types.

The influence of moisture, air and soil acidity determine whether the bacteria will be beneficial or detrimental to good plant growth.

William Mitchell,
Onondaga Golf and Country Club,
Fayetteville, N. Y.

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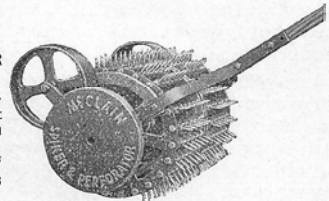
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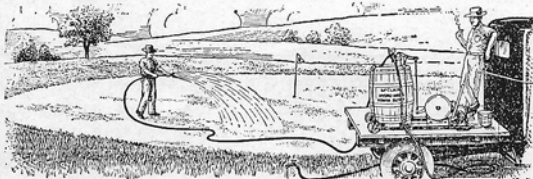
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