TORO NEWS FOR GOOD GOLF COURSE SUPERINTENDENTS

TORO MASTER MODEL B TRACTOR

A real outfit built from the ground up to handle its job well. The Toro is a golf course tractor all the way through, with heavy chassis, special radiator; a brute of a rear end that can almost pull stumps without tearing it up; 15-inch tires on the rear wheels; all steel dump body holding one cu. yd.; starter. It is in every way a thoroughly dependable, handy all around tractor.

This machine is furnished regularly with steel tires front and rear. May be had with pneumatic tires in front and steel in the rear, or pneumatic tires all the way round, or steel in front and Barth in the rear, or pneumatic in the front and Barth in the rear. Rubber tires extra. When it is equipped with pneumatic tires in the front and Barth in the rear it makes an excellent truck as well as tractor.

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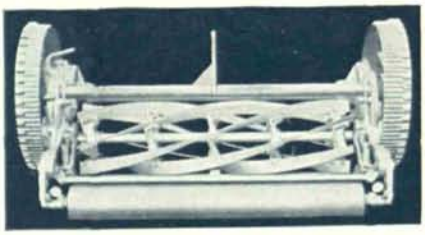
1932 TORO TROJAN MOWER



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Like everything else Toro ever built, extra strength has been added to meet difficult operating conditions. The worm gearing has been strongly improved and is guaranteed for two years. Try these new Toro Rotary's. You will like them.

Your 1932 Catalog is Waiting. Write For It.

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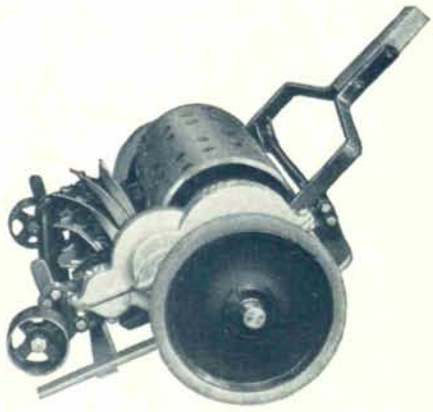
TORO STANDARD PUTTING GREEN MOWER



Without Attachments **$55.00**

This excellent machine, which, to use a hackneyed expression has been widely imitated but never equalled, needs no introduction to club officials or greenkeepers anywhere in the United States. The Toro greens mower is and has been in a class by itself. Toro greensmowers eight and nine years old are still in operation with years of service ahead of them. This superlatively fine mower has been reduced in price this year. Avail yourself of the opportunity to round out your greenmowers, making them 100% Toro at comparatively small investment.

MARCH, 1932
VOLUME VI—NO. 3

The NATIONAL GREENKEEPER

(*Registered U. S. Patent Office*)

Single Copies Twenty-Five Cents.
Yearly Subscription Three Dollars.

Official Organ of the National Association of Greenkeepers of America

Published monthly at 405 Caxton Building, Cleveland, Ohio.

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

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MARCH
1932
VOLUME VI
NUMBER III

The NATIONAL GREENKEEPER

Official Organ of The National Association of Greenkeepers of America

Golf Course Maintenance Budgeting

By JOHN MACGREGOR, *Greenkeeper*
Chicago Golf Club, Wheaton, Illinois

Read at the 6th Annual Educational Conference of the National Association of Greenkeepers of America, held at New York City, January 19-22.

WHEN Mr. Morley, our president, wrote and asked if I would take a place on this program, I immediately advised him that it would be a pleasure and an honor to do so, and that I would select as my subject, "Golf Course Maintenance Budgeting."

There has never been a time in many years when this matter assumed the importance that it does today. In every club in the United States, almost without exception, the question of making the dollar do a bigger job in the way of greens maintenance is a vital one confronting not only the directors of the club, but naturally the greenkeeper himself.

JOHN MACGREGOR

One of America's foremost greenkeepers, who has given intensive study to the problem of systematizing golf course maintenance.

This of all time is the time when the greenkeeper can demonstrate that he is not only an expert on grasses and course maintenance, but a business man capable of conserving his employer's money yet giving results in time of need. And when I talk about golf course maintenance budgeting, I am talking about a tool which will enable you to materially reduce outlay in the majority of cases without sacrificing those playing conditions so necessary to keep your members proud of their course.

The moment we face budgeting in connection with greenkeeping, a picture necessarily arises of figures—of not only forecasting expenditures, but of carefully keeping track of them as they are made, to see that the forecasts have not been exceeded. This sounds like accounting, but it is not accounting at all. It is just a matter of keeping track of what you are doing so you yourself day by day will know without having to depend on anybody else, what you are spending.

GREENKEEPER MUST KEEP HIS COSTS

IF A greenkeeper was an accountant he would not be a greenkeeper, but this does not mean that a greenkeeper should not be a cost-keeper, because he should. And to keep his costs he must have, not a complicated accounting distribution system, but a simple, efficient set of records whereby in from five to fifteen minutes time at the end of each day he can distribute his labor charges and material charges to the places where these costs should be charged. I believe I am safe in saying that until about three years ago very little cost-keeping was done by any greenkeeper, and about the only reason in the world why it was not done was that the greenkeeper felt that he was doing a man-sized job in keeping the course in condition.

Perhaps I might also say that the average greenkeeper, myself included, when we first instituted our system, faced the daily recording of figures and distribution of his costs with some question as to whether he was capable of book work. My experience shows that it is far simpler than the majority

of us thought it would be. Now, today, conditions have changed. Instead of saying, "Keep the course perfect no matter what the cost," the club says, "Keep the course perfect but don't exceed a certain amount."

Club officials generally, recognize that if their club is to continue to operate, maintenance costs both on the golf course and in the club house will have to be materially reduced. This cannot be done by cutting quality of food or the condition of the course, because that would cut down patronage—and we must have two things today—maximum patronage available and minimum operating expenses on all sides. Many of our members to whom the necessity has not previously been brought home are faced with a problem entirely new to their experience, the necessity of reducing costs and yet maintaining desirable conditions at the club.

If, within the next two years, and I advance it as a prediction, every greenkeeper has not installed and put in operation for himself an efficient system of daily cost-keeping, he will have a difficult time controlling his costs, and consequently a difficult time in holding his position.

BUDGET EXPENDITURES MUST BE ITEMIZED

WHEN you used to speak of budgets, they meant so much money appropriated for maintenance, and the man in charge of the greens came about as close to the figure as he found possible. No thought was given to the items and expenditures—for instance, how much it would cost to mow the greens for a day, a week, a month or a year, and certainly there was no daily attempt to control and govern these costs, which after all is the important part of greens maintenance budgeting.

A business, no matter what its character, cannot be successfully operated without efficiency. This applies to golf course maintenance, or the profession of greenkeeping, and efficiency simply means setting a certain amount to spend and a certain quality to be achieved, and then attaining your objective without spending as much as has been appropriated, if possible.

To work out a simple form of cost-keeping, it is first necessary to organize yourself and your basic work—have a system in your labor operation—just like a factory. Allot to each man a certain task or combination of tasks—estimate approximately the cost of each job each day. When you have done this, you have a foundation upon which to estimate labor costs for each month, and a total for the year.

It is relatively simple to estimate how many men are necessary to successfully maintain your course —to allot each man a reasonable amount of work to do and see that the work is done efficiently. In other words, don't watch your men to see that they are working, but watch the men's work to see that it is done properly and in sufficient volume. This solves the problem of the superintendence of men over a widely scattered area to a greater degree than anything I have ever encountered. This is proving itself a far more practical and economical method of operation than working men in gangs or crews.

A man who has a certain amount of work to do either does that work on time and properly, or he is replaced. It results, too, in the elimination of the unfit and the creating of a picked crew after a season's work.

Now when you have figured and estimated about how much money is necessary for labor, your attention must then be turned to upkeep—to fertilizers, fungicides, vermin eradicators, sand, gasoline, oils, grease, power, machinery parts and repairs and other smaller items classed under miscellaneous. Approximately estimate this, and then add it to the cost of labor and upkeep, and that will be your budget for the ensuing year.

ASK FOR EXCESS BUDGET TO MEET EMERGENCIES

HOWEVER, in view of the uncertainty of weather conditions and the always present possibility of drought and insect pests, to play safe it is well to ask for a thousand dollar reserve fund which, while you don't intend to use it under normal conditions, will be there to prevent you exceeding your budget in case of emergency.

When it comes to the distribution of labor and upkeep, this is either a daily job or it is valueless. To accomplish this you keep a diary of your day's operations, and the cost of the different work done. It is surprising how simple it is to keep the cost of operation if you will carry a diary in your pocket and make your entries from it promptly.

With this diary it is simple to determine the cost of the different items. The next step is to have available a monthly cost sheet, and take the items daily out of your diary and distribute on these cost sheets as concisely as possible and in the proper divisions.

One way of handling the monthly cost sheet is to divide it into eight headings, for instance, green mowing and green sprinkling would be one heading. Enter separately all of your other major operations, including rough cutting, fairway mowing, etc., so each will be allotted a column.

Now if your entries are made daily, it is an easy matter to total from time to time and see how you are running against your budget. You will have this information if your Green chairman should want to know, and if he doesn't want to know, you should know anyway.

At the end of each month, every greenkeeper operating under this plan knows from his own notes how much he is over or under his budget to that date. It is hardly necessary to call your attention to the fact that upkeep items are totalled once each month.

GREENKEEPER KNOWS DAILY WHERE HE STANDS

My experience has been, operating under this system for two years, that where I used to have to wait until near the end of the succeeding month to find out from the accountant what I had spent, I now know daily, weekly, and the first of each month exactly where I stand. At the end of the year, the different items in each group are pulled off and compiled on one sheet, and the total yearly operations submitted to the Green committee chairman.

I believe that four years ago if anybody had put this cost-keeping budgeting proposition up to me as an absolute requirement in connection with my work, I would have been greatly worried. I would have feared the accounting part of the task and questioned as to whether or not I was capable of handling it to the satisfaction of myself and my employers.

Today, after two years' experience, I want to say to you in all sincerity that the cost-keeping or record-making or whatever you want to call it, has not been in any sense a burden on me, and I hope never again to have to operate a golf course without my own figures to tell me constantly what I am doing, and enable me to control costs and expenditures. Thank you.

Nitrogen—What Is It?

Factors Affecting the Accumulation of Nitrate Nitrogen in Soil

By PROFESSOR M. H. CUBBON
Massachusetts State College, Amherst, Mass.

Read at the 6th Annual Educational Conference of the National Association of Greenkeepers of America, held at New York City, January 19-22.

NATURE has put bacteria into soil in many different varieties and kinds, each to do a rather particular job. There are certain organisms which work on one type of organic matter, and others for different types. There is a division of labor; the products which one group discards as waste materials another group requires as food.

M. H. CUBBON

Who has made a close study of soil conditions and the action of bacteria in the growth of fine turf.

When organic matter is decayed by soil organisms, it produces simple substances, mostly gases. Of these gases the one that concerns us most is ammonia. Regardless of how complex the organic matter may be the nitrogen in it ultimately reaches the ammonia condition. As many as a dozen different groups of organisms in soil produce ammonia from organic nitrogen. Thus if one group happens to be indisposed another is there to do the work. Nature has generously provided for a plentiful supply of ammonia.

Plants normally cannot use nitrogen as ammonia, hence it must be changed to a usable form. This form happens to be nitrate nitrogen. Nitrates are produced from ammonia by a process of oxidation by two groups of bacteria. Such bacteria are specialized workers. If conditions are unfavorable to them the production of nitrates must stop because there are no other organisms to do this particular job.

NITRATE BACTERIA ARE SKILLED WORKMEN

LIKE many skilled workmen, nitrate bacteria are quite particular about the conditions under which they labor. The soil must neither be too wet, nor too acid, nor too cold. Nature usually has soils that are quite acid, and very often wet and cold, yet plants are expected to find the nitrates they need. In the case of greens, man often makes conditions worse instead of better, unintentionally, of course.

Let us look more into the details of the requirements for nitrate production in soil. Since the process is one of oxidation, plenty of oxygen must be present. Soil that is packed or wet has little and sometimes no air (oxygen) space. Plants growing on wet soil often show yellow leaves and look sickly, largely because they cannot get the nitrogen needed. When forced to do so by conditions, bacteria can take the oxygen away from nitrate and use it to support themselves, and, of course, plants suffer because the nitrogen is no longer available. In most cases the harm done by a wet soil is indirect rather than direct, but this does not prevent it from being serious.

Heavy soils (silts, clays, loams) are the ones that pack worst. The remedy is to incorporate sand, organic matter, or any material which will loosen the soil. Packing is much worse when soil is wet. Packing due to persons walking over greens is much more severe than the rolling which the greens normally get.

Ordinary temperatures are satisfactory for the production of nitrates. By ordinary is meant above 60° F. Acid soils require somewhat higher temperatures than 60, while neutral soils are able to

NEXT MONTH

In the April issue of the NATIONAL GREENKEEPER, several interesting papers read at the New York Educational Conference will be published, among them being, "The Care of Trees," by Homer L. Jacobs—"Soil Structure of Putting Greens," by Kenneth Welton—and "Economy on the Golf Course," by John Quaill.

produce considerable nitrates as low as 50°. This may account for a difference in starting time in spring.

SOIL ACIDITY IS IMPORTANT FACTOR

By far the most important single factor in the production of nitrates is the soil acidity. Acidity is expressed in terms of pH value, confusing though the term may be. pH 7 is neutral, and any pH value less than 7 is acid. The smaller the number expressing pH value, the greater the acidity, or the more acid the soil. pH 4 is therefore more acid than pH 5. Soils rarely get below pH 4, while pH 5 is too much acid for most plants. pH 6 is perhaps a little too high for the best greens conditions, everything considered.

In most soils, bacteria do not produce nitrates when the acidity is stronger than pH 5. Considerable variation among soils occurs and in some cases exceptions do happen. This is typical of the complex conditions found in soils. If there were no variables the science of fertilizing soils would soon become exact. As it is, nobody can put his finger definitely on some of the problems confronting us.

The amount of nitrate accumulating in the soil from organic fertilizers and materials depends pretty largely on the ratio between nitrogen and carbon. If too much carbon is present in proportion to the nitrogen, nitrates do not appear in the soil for sometime after adding the organic material. Organic materials with less than 4% nitrogen usually produce this absence of nitrates. Peat moss comes in this class. Many times it has tended to give poor results, which could have been avoided if a little nitrogen had been added with the peat. After the bacteria have worked on the organic material and have largely decayed it, some nitrate has a chance to accumulate. These so-called toxic effects of peat are therefore only a shortage of nitrogen because the bacteria which decay the peat take nitrogen away from the plants.

AVAILABILITY OF ORGANIC NITROGEN FERTILIZERS

The question of how quickly organic nitrogen fertilizers become available can be partly answered as follows: Nitrate accumulation from organic nitrogen sources is closely related to the amount of water-soluble nitrogen in the organic material. In the case of cottonseed meal compared with dried blood on soil 3 (Massachusetts) you will notice that cottonseed accumulated nitrates faster than did dried blood. The water-soluble nitrogen in each fertilizer is practically the same, but the proportion of water-soluble nitrogen in cottonseed meal to total nitrogen is much higher than in dried blood.

Again exceptions occur in this respect, but it is fairly safe to say that nitrate nitrogen accumulates from organic materials practically in proportion to the amount of water-soluble nitrogen contained.

The rapidity with which nitrate nitrogen accumulates in soil is the best single measurement we have for the productivity of that soil. In making controlled experiments it is the common practice to add to soil some nitrogenous fertilizer such as sulphate of ammonia, keep the soil at favorable moisture and temperature for a time, and then determine the amount of nitrate in the soil. In the tables following are given summaries of experiments in which nitrate accumulation was studied. This accumulation is stated as a per cent of the original nitrogen added to the soil. The important thing in all tables except the last is the time factor.

Nitrate Accumulation

Description of Soil	Mgms. of nitrogen added per 100 gms.. soil	Per cent nitrogen changed to nitrate after 10 Days	15 Days	20 Days	28 Days
Basic silt loam	10	72	82	88	94
	30	33	53	70	92
Neutral fine sandy loam	10	55	86	90	109
	30	14	32	53	71
Medium acid loam	10	31	53	63	97
	30	10	18	22	39

Nitrate Accumulation In Alabama Soils

	pH values	% nitrogen changed to nitrate after 10 Days	20 Days	30 Days
Soil No. 1	5.2	15	32	66
	5.6	66	93	100
Soil No. 2	5.9	42	--	--
	6.2	91	--	--
Soil No. 3	5.6	33	--	--
	6.8	96	--	--

In this experiment 4 mgms. nitrogen were added per 100 grams of soil. In both experiments nitrogen was supplied as sulphate of ammonia.

Nitrate Accumulation In Massachusetts

Soil No. 1—Fertile sandy loam. pH value 6.12. 8 milligrams nitrogen added from various substances.

Source of Nitrogen	Per cent nitrogen changed to nitrate in 4 Days	6 Days	10 Days	14 Days	22 Days
Cottonseed Meal	0	.7	0	21.2	16.5
Castor Pomace	0	8.5	13.7	22.9	15.0
Urea	4.8	16.1	48.1	88.2	114.2
Dried Blood	2.03	0	33.6	68.2	114.2
Milorganite	9.1	18.1	45.0	27.9	55.0
Grass Clippings	13.0	31.6	45.5	33.7	44.7