

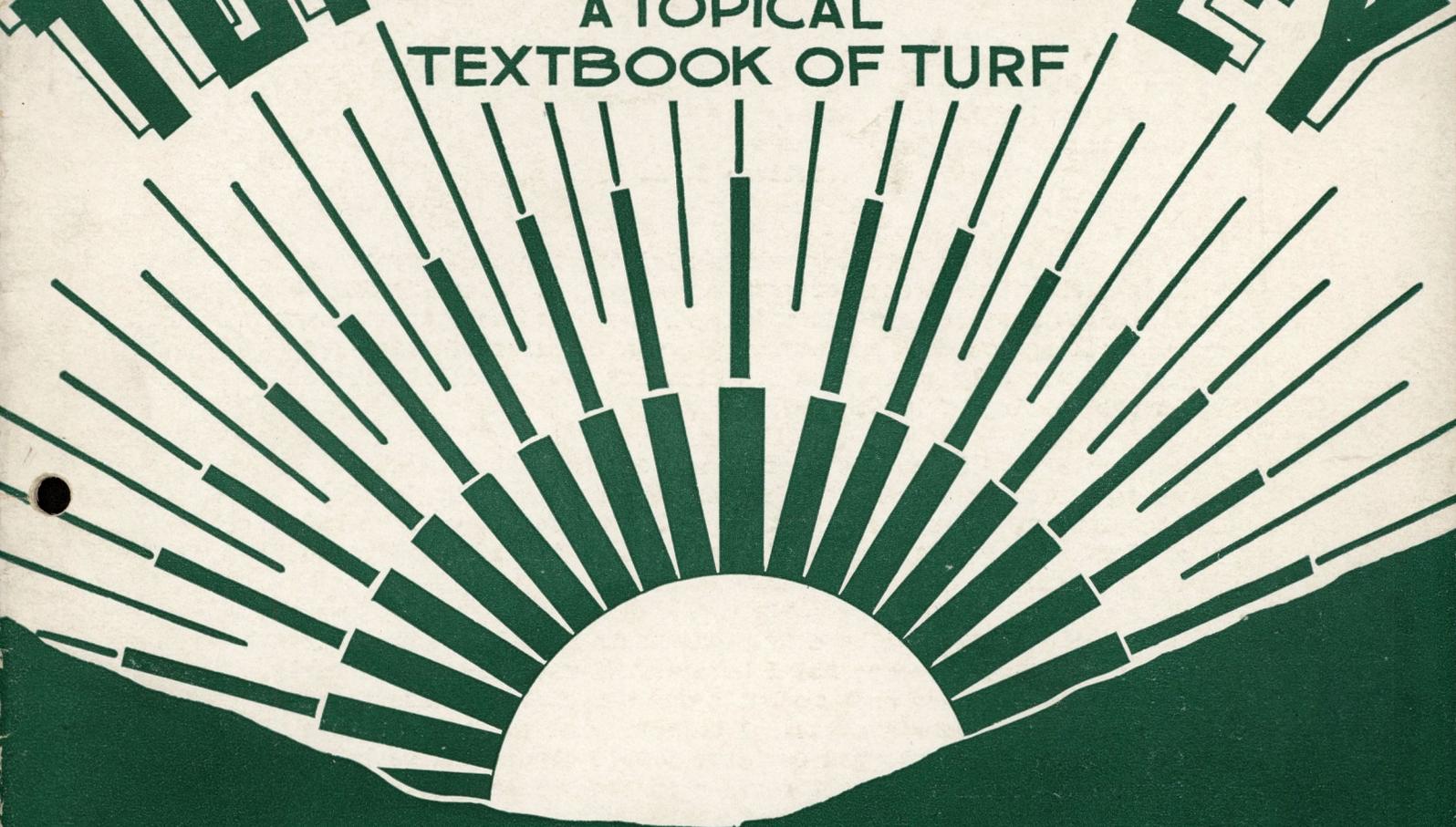
VOLUME I
NUMBER 3

APRIL
1936

The

TURF SUARVEY

A TOPICAL
TEXTBOOK OF TURF



GOLF COURSES AIRPORTS
POLO FIELDS CEMETERIES
ATHLETIC FIELDS
PARKS LAWNS ESTATES

A MONTHLY MAGAZINE DEVOTED TO THE INTERESTS
- OF ALL TURF GROWERS IN THE -
- UNITED STATES AND CANADA -



WESTWOOD COUNTRY CLUB

CONWAY ROAD - ST. LOUIS COUNTY

CLAYTON
MISSOURI

February 24, 1936

LEO S. BAUMAN, CHAIRMAN
GROUNDS AND GREENS COMMITTEE
720 OLIVE STREET
ST. LOUIS

The Turf Survey
1900 Superior Avenue, East
Cleveland, Ohio

Attention: G. A. Farley

Gentlemen:

On Saturday, while visiting our club, my grounds-keeper showed me a copy of your new magazine. After reading the different articles and editorials, I could not help writing you and telling you what a distinct place a magazine of this type has for not only golf clubs but also any one who is interested in the raising of turf.

Since the passing out of the bulletins which were previously sent out each month by the United States Golf Association, under the direction of Dr. Monteith, we have had no information whatever regarding problems in different parts of the country.

It has been my pleasure to have known Dr. Monteith for a great many years; and I have worked with him considerably, as only seven years ago, we built our new club and were faced with rather a bad situation. I am very glad to state at this time that we have whipped our course into shape; and we believe it is one of the best golf courses in the Middle West.

I have given our cashier one of your blanks so that you could enter our subscription; and it will be my great pleasure to pass the balance of the blanks that are in the February issue to friends of mine here in the St. Louis District.

It so happens that I am not only Chairman of the Grounds of our own club; but I am also Chairman of the Grass Section of our entire St. Louis District. I am also Vice-President of the St. Louis Golf Association. Any help that I can give you at any time to make your magazine a success, don't hesitate to call on me.

Sincerely yours

LSBauman:CD

THE TURF SURVEY

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Editor and Advertising Manager, G. A. FARLEY *Assistant Editor*, D. A. PERCY *Subscription Manager*, FRANK E. PERCY, JR.

Volume I

APRIL, 1936

Number 3

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SPRING IN HIGH GEAR

APRIL is a month of humming activity in the world of TURF, every man snapping from one job to another in preparation for the outdoor recreation of millions of people who seek relief from the restraint and confinement imposed by Winter's snow and ice.

The winter of 1935-36 has been a record-breaker, finally culminating in flood conditions which brought tragedy to thousands of the American people, and stark ruin upon millions of acres of land. Few districts in the northern and central sections of the country escaped serious flood damage, and turf growers in most populous sections are confronted with extensive major repairs.

Throughout some of the northern states where frost depth is rarely more than three feet, the ground was solidly frozen to a depth of four to five feet. Snowfall throughout the winter was heavy, and sudden thaws, followed by rain, combined to fill rivers and their tributaries to a higher level than has been known for many years. Frost and flood damage is prevalent in practically all parts of the northern areas, and the northern turf grower, who is expected to provide playable golf courses and other recreational surfaces in good time and condition this season is liable to remember the month of April, 1936, for a long time to come.

Turf surfaces in most sections are due to remain soft for a longer period than usual, therefore extra care must be used to prevent damage in the rush of spring work. The excessive labor turn-over of the past few years has resulted in the employment of many men inexperienced in the handling of machinery on turfed areas. This spring opens upon a scene brightened by much improved business conditions, and a consequent resumption of larger payrolls.

Men, who for several years were among the standbys on golf course, park, cemetery and estate properties, must be replaced in many cases by others to whom the care of fine turf is a closed book. For instance, here is a difficulty as to tractor operation, taken from a chapter of the textbook, *Golf Course Commonsense*:

"Gouges are often taken out of fairway turf by a too quick turn made by a tractor operator. Drive wheel slip-

page is unavoidable at times when the grass is somewhat wet and slippery, and the tractor is stopped and started again for some reason on the fairway surface. Extreme care must be taken in handling the clutch whenever such a stop and start must be made, as, even in dry weather, careless jerks in shifting gears result in tearing out chunks of good fairway turf. A mechanic who has been operating a tractor with a construction gang building a highway may be a good mechanic, and a good tractor operator, but it would seem reasonable to suppose that such a man will require considerable watching when he starts his operations on a fairway."

Another chapter in the book, covering the subject of rolling in the spring, describes precautionary measures as follows:

"Spring rolling of fairways should be done as soon as the frost is out of the ground, and the surface is fairly firm to the pressure of the foot. Wet areas should be left until they are dried out sufficiently not to pack under the weight of the rollers. Sometimes low areas are left until after all the higher portions of the fairways on the course have been rolled, as rolling must progress in accordance with contours, soil structure and weather conditions.

"Heavy clay loam fairways are rarely rolled more than once a season, and particular care must be observed to prevent packing the surface with either heavy rollers or other heavy equipment in use on these areas.

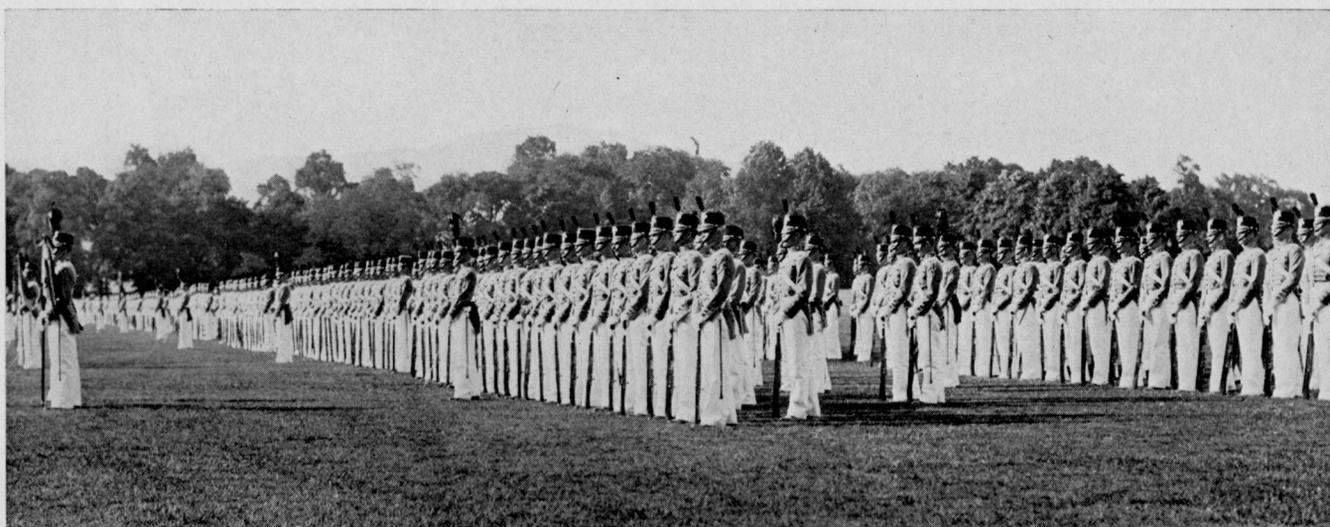
"In handling fairways composed of light soil, rolling several times during the season is a universal practice, and such rollings should follow after a rain, preferably the day after the rainfall has soaked the top three to four inches of soil. Fairway mowing equipment sometimes disturbs the surface, and any gouges or damage to the turf should be repaired just prior to rolling.

"Rolling of playing surfaces can be discussed in general terms only, the one specific recommendation being that no turf should be rolled or subjected to the damage inevitable in the use of heavy tractor equipment when the soil is in a water-logged condition."

EMPLOYMENT SERVICE

Since the Inaugural number of the *Turf Survey* was published we have received several registrations from greenkeepers with excellent qualifications who wish to make connections with golf clubs in search of such expert services this year.

Golf Club officials are asked to send to the office of the *Turf Survey*, 1900 Superior Ave., Cleveland, O., full particulars as to any positions they have to offer. All correspondence will be held confidential, and greenkeepers recommended will furnish proper references.



Cadets in formation on the parade ground at the United States Military Academy at West Point, New York.

GROWING TURF ON ATHLETIC FIELDS AT THE U. S. MILITARY ACADEMY

By L. D. WORSHAM
Major, Corps of Engineers
Graduate Manager of Athletics

THE United States Military Academy, founded in 1802, is located on the west bank of the Hudson River about fifty-two miles north of New York City. It is situated in the Hudson Highlands in the midst of rugged scenery. Most of the buildings are constructed of native granite which blends with the surrounding hills and makes it a very beautiful place.

However, the site of the Military Academy is limited as to flat area. This creates a great problem in securing adequate drill and athletic fields which is being enhanced since the authorized strength of the Corps of Cadets has been increased to 1960. The present strength of the Corps is 1451 cadets.

PROBLEMS OF EXCESSIVE WEAR

Since there is a shortage of flat area it necessitates the use of fields for more than one purpose. The Graduate Manager of Athletics is assigned the duty of allotting athletic fields and their operation and maintenance.

The outfield of our baseball diamond is used in the fall for football practice. This gives us two football practice fields which are in use from September to the end of November. These same fields are used for drill purposes in the summer.

Another field is used for lacrosse in the spring, soccer in the fall and a two-day Horse Show during the first week in June.

Michie Stadium is the site of our home football games. It is used in the spring for football practice during the month of April and in the fall for the playing of football games.

There are two polo fields. One is used exclusively for polo games and practice in the spring and summer. In the fall it is used for plebe (freshman) football. The other polo field is used for baseball and lacrosse in the

spring, for drill in the summer and for soccer and football during the fall months.

SOIL ANALYSIS EVERY TWO YEARS

It can be seen from the above that the fields are in use during the best grass growing months of the year, namely early fall and early spring. Moreover, it is necessary that the turf present a pleasing appearance in keeping with the beautiful main parade ground. To accomplish this, in spite of the mechanical injury to the turf caused by excessive use, presents a year round problem.

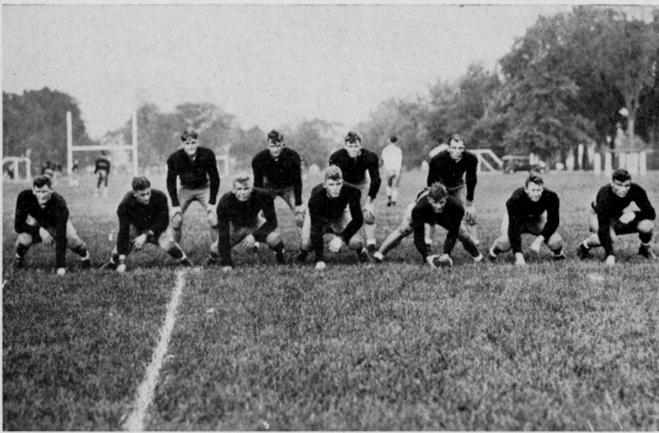
During a period of years there has been developed a procedure which it is thought is best adapted to our particular problem. Soil from the various fields is analyzed at least once every two years. This analysis determines whether or not the soil is low in nitrogen, phosphoric acid or potash. From this knowledge the element or elements which are deficient are applied to the fields.

EXPERIMENT WITH PEAT MOSS

Last fall an experiment was tried on our practice football fields. Experience had shown that turf would be worn bare in several spots on each of our two varsity football practice fields by the middle of October. Fortunately, by this time most of the body contact work is over. However, it was desired to keep the soil springy to avoid shin splints and joint injuries. To accomplish this, ten bales of peat moss were applied to each practice field. The peat moss was worked into the soil by the cleats on the shoes of the players. The results were very satisfactory, the football coach reporting that the fields were in the best condition he had ever seen them.

DETAILED METHODS OF MAINTENANCE

The general and customary procedure is illustrated by



Grass on the practice fields at West Point is kept at about three inches in height. Such thick cushions of turf definitely lessen the hazards of the game.

the following memorandum which was issued to the foreman in charge of fields.

"SUBJECT: Care of Grass on Athletic Fields.

TO: Foreman in Charge.

1. The Care of grass has been given intensive study by the undersigned and his predecessors. Advice has been received from experts of the Department of Agriculture and the United States Golf Association. The instructions contained herein are based on this information and actual experience.

2. *Treatment in Spring.*

a. *Rolling.* Grass roots are lifted during the winter due to heaving of the soil caused by alternate freezing and thawing. After the last freeze and when the ground is fairly dry, usually in April, the fields should be rolled so as to replace the grass roots. After this has been accomplished, the fields should be rolled very little as too much rolling compacts or puddles the soil to such an extent that roots cannot penetrate deeply and tender young grass shoots cannot push through the hard soil. Also, water runs off compacted soil instead of penetrating it.

b. *Fertilizer.* An application of fertilizer consisting of one part sulphate of ammonia and three parts cottonseed meal will be applied to each field at the rate of 6 to 8 pounds to one thousand square feet. This should be applied in late April or early May, because lawn grasses are making growth at this time while there is dew or other moisture on it. Therefore, it should be applied about mid-day on a fair day.

3. *Fall.*

a. *Seeds.* It is unnecessary to seed fields except where ground is bare or the grass is thin. Experience at West Point has shown that blue grass makes the best turf for athletic fields. However, blue grass is slow to germinate so some quick germinating grass, such as red top and the rye grasses, helps to hold the blue grass seed. Chewings fescue will grow better than blue grass on poor soil. For this reason we will use a formula as follows, measured by weight:—

- 20% Chewings fescue
- 65% Blue grass
- 10% Red top
- 5% Pacey's Rye grass

b. *Fertilizer.* About the middle of September, fer-

tilizer consisting of one part sulphate of ammonia and three parts of cottonseed meal will be applied to all athletic fields at the rate of 6 to 8 pounds per one thousand square feet. Sewage sludge (Milorganite) or pulverized poultry manure may be substituted for cottonseed meal.

c. *Time of Seeding.* It is best to sow grass seed in September, since lawn grasses make growth in September and October while weeds and foreign grasses, such as crab grass, goose grass, etc., are declining. Since our fields are in use at this time, we must sow seed after the end of the playing season, which is at the end of November.

d. *Preparation of Field Before Seeding.* All dead grass and weeds should be raked off. Holes should be filled with a mixture of three parts top soil and one part mushroom manure or humus. About $\frac{1}{4}$ to $\frac{1}{2}$ inch of the same mixture should be applied to bare areas. Seed should then be sowed with seeding machine, one application to be made with machine moving north and south, and one with machine moving east and west. For sowing small bare areas seed can be mixed with three parts of top soil and one part of humus or mushroom manure and sowed by hand. After sowing, the field should be rolled.

e. During playing season all divots should be replaced each day and pressed firmly home with the feet or a hand tamper. Holes should be filled with a mixture of top soil (3 parts) humus or mushroom manure (1 part). This should be covered to a depth not to exceed $\frac{1}{8}$ of one inch with same mixture with which seed has been mixed.

4. *Summer.*

a. *Weeding.* During the summer months, weeds are growing faster than the grass. Therefore, watering should be kept at a minimum. A good soaking twice a week is much better than light watering daily since the latter makes the roots come up to the surface to secure the water. Because of our large fields it is necessary to water a portion of the field each night. This watering will be done from 6 P.M. to 10 P.M.

b. *Mowing.* Blue grass thrives best when not permitted to grow higher than five inches and then cutting so as to leave the grass standing about 3 inches. Polo players desire the grass to be as short as possible. As a compromise, the cutters on the mowers used on the polo field will be set at $1\frac{1}{4}$ inches. For all other fields the mower, if a regular side bar mower is used, will be set so that the grass after cutting is three inches high. If gang mowers are used, the cutting edge will be set at three inches.

The problem of satisfactory turf, particularly turf which must be used as well as looked at, is not an easy one to solve. No general solution, which will apply to all cases, can be given, since conditions in different localities vary so much. These variants are climate, soil and use made of the turf. Patience is essential which reminds one of the answer given by an English land owner when asked how he developed such a wonderful lawn. He replied: "It is very simple. The lawn is fertilized each fall, it is trimmed by grazing sheep during the growing season, it is rolled in the spring, and at the end of one hundred years we have a very fine lawn."



One of the most beautiful settings for an athletic field in the country, Mitchie Stadium, at West Point.

FEEDING TURF GRASSES ON LAWNS, PARKS, AND RECREATION FIELDS

By HOWARD B. SPRAGUE

Agronomist, New Jersey Agricultural Experiment Station
New Brunswick, N. J.

HEALTHY turf is dependent in large measure on maintaining a comparatively high state of soil fertility by proper management. Practically all soils in this region require the regular use of fertilizer to ensure the desired supply of plant nutrients. Although certain types of grasses are more tolerant of low soil fertility than others, all species make the most satisfactory growth when the essential elements for growth are present in liberal amounts. Weed control, prevention of drought injury, avoidance of disease outbreaks, resistance to insect attacks, etc., are all intimately related to the proper use of fertilizers.

ESSENTIAL PLANT NUTRIENTS

Farmyard or stable manure is no longer recognized as the standard source of plant food for lawns. Commercial fertilizers are applied with greater effectiveness and at a considerably lower cost. In addition, commercial fertilizers do not contain weed seed, are not offensive or unsightly, and may be readily obtained in any community.

A complete commercial fertilizer contains the three more important nutrients frequently deficient in soils, namely, *nitrogen*, *phosphoric acid*, and *potash*. Nitrogen is needed for vigorous leaf and stem growth, phosphoric acid for root development, and potash for general tone and vigor and resistance to disease. Certain commercial fertilizers do not carry all three of these nutrients. Thus, sulfate of ammonia and nitrate of soda supply nitrogen only, superphosphate carries phosphoric acid only, and such sub-

stances as bone meal and tankage provide nitrogen and phosphoric acid but no potash. Fortunately, our State laws require that the percentage of each of the plant nutrients contained in fertilizer be stated on the bag or package of the material offered for sale. A complete fertilizer is not necessarily well balanced for all purposes. The proper ratio of fertilizer elements should be varied to suit the requirements of specific plants and soil conditions. The value of commercial fertilizers is determined by their plant food content, and the form in which each of the nutrients is provided, rather than by an attractive name or unfounded claims made for the material.

FORMS OF NITROGEN

For the development of turf grasses, nitrogen is the most important of the three nutrients supplied in commercial fertilizers. The choice of a fertilizer should depend on the form in which the nitrogen is present. Nitrogen may be supplied as *ammonia compounds*, *nitrate compounds*, or *organic compounds*. The ammonia compounds, such as sulfate of ammonia and urea, are readily utilized by grasses growing in soils which are not strongly acid. These substances tend to make the soil more acid, however, and must therefore be balanced with lime to be permanently useful. Nitrate compounds such as nitrate of soda, are readily absorbed by grasses, and are preferable to other forms of nitrogen on soils which are acid, or acid soils that have been limed recently. Organic forms of nitrogen such as bone meal, tankage, cottonseed meal and sewage sludge, are slowly available since these materials

decompose and release their plant food only in comparatively warm moist weather.

A general grass fertilizer should include the three types of nitrogen compounds listed above for most satisfactory results. For individual areas, the fertilizer may be varied to suit the particular conditions. Nitrate nitrogen should predominate in the fertilizer formula on strongly acid soils, whereas organic nitrogen should be present in substantial amounts for very sandy and shaley soils, to prevent undue losses of nutrients by washing.

Although nitrogen is essential for turf grasses, an excessive supply is extremely injurious. The quantity of fertilizer applied to supplement natural fertility of the soil should be limited to that actually required for hardy growth of grass, rather than immoderate applications which stimulate tender luxuriant vegetation readily injured by wear, disease, insects and other unfavorable conditions.

PHOSPHATES AND POTASH

In general, all lawn soils in this region are naturally deficient in available phosphates. The use of manure, sulfate of ammonia, nitrate of soda and similar fertilizers has accentuated this deficiency, with the result that on many lawns, the lack of sufficient phosphoric acid is definitely limiting root and top growth. Lawn fertilizers should contain a liberal proportion of phosphoric acid to provide a regular supply of this element. Unlike nitrogen, an abundance of phosphoric acid produces no harmful effects on turf. The role of *potash* in increasing the resistance of grass to disease and other adverse conditions, indicates the need for including this nutrient in a complete fertilizer for use on lawns.

KINDS OF FERTILIZER TO USE

There is no single ratio of elements that may be considered ideal in a lawn fertilizer for all locations. On phosphate deficient soils, phosphoric acid should predominate in the fertilizer mixture, with sufficient nitrogen included to produce satisfactory top growth. An ample supply of both phosphates and potash in the soil is particularly important on lawns composed largely of Kentucky blue grass. For lawns including mixed vegetation on soils of average fertility, fertilizers containing 4 to 5% nitrogen, 8 to 10% phosphoric acid, and 4 to 5% potash should prove suitable. The nitrogen should be derived as follows: Approximately $\frac{1}{3}$ from nitrate compounds, $\frac{1}{3}$ from ammonia compounds and the remainder from organic sources of nitrogen. The phosphoric acid may be supplied by superphosphate and bone meal, and potash by muriate of potash.

On soils which are comparatively fertile, the ratio of nitrogen to other plant nutrients may be somewhat higher, and the amounts used may be adjusted to avoid applying

an excess of nitrogen. Fertilizers analyzing 8-6-4, 10-8-6, and 10-6-4 have proved useful on lawns of this type.

The following general rules as to the use of commercial fertilizers, made from such materials as those suggested above, are known to be successful for lawns generally.

Kind of Soil	Fertilizer Type* (Guaranteed Analysis)	Amount to Apply Lbs. Per 1,000 Sq. Ft.	
		Early Spring	Sept.-Oct.
Average to poor lawn soils	5- 8-5 }	10 to 20 lbs.	10 to 20 lbs.
	5-10-5 }		
	4-12-4 }		
	15-30-15	3 to 7 lbs.	3 to 7 lbs.
Fertile soils, well supplied with phosphates	8-6-4 }	5 to 10 lbs.	5 to 10 lbs.
	10-8-6 }		
	10-6-4 }		

*The figures given in a fertilizer analysis refer to the plant nutrients contained. Thus, a 5-8-5 fertilizer is one which contains in each 100 lbs. of total weight, 5 lbs. of nitrogen, 8 lbs. of phosphoric acid and 5 lbs. of potash.

BALANCED FEEDING

Although commercial fertilizers state the total plant food contained, no information is usually given as to the materials from which the plant food is derived. Many of the widely advertised lawn fertilizers are wholly soluble, with nearly all the nitrogen present in the form of ammonia compounds which are not readily utilized on strongly acid soils. Where it is convenient to apply such fertilizers, they should be supplemented with organic materials. In this case the application per 1,000 square feet may consist of 8 to 15 pounds of a 5-10-5 or 4-12-4 fertilizer and 10 to 20 pounds of dehydrated manure, bone meal, castor pomace, cottonseed meal, soybean meal, activated sewage sludge or some similar substance.

LIMITATIONS OF ORGANIC FERTILIZERS ALONE

Reliance should not be placed entirely on such organic materials as manure and bonemeal, as the sole fertilizer for lawns. Such substances decompose slowly in cool weather and consequently little plant food is supplied in autumn and spring when turf grasses make use of plant nutrients to greatest advantage. Moreover, organic fertilizers release most of the plant food in the summer period and thus favor the growth of crab grass and similar weeds that thrive in hot humid weather. In general, all fertilizers should be withheld during the summer months to avoid the danger of burning the turf, and the stimulation of summer weeds.

TIME AND METHOD OF APPLICATION

Fertilizer applications are most effective on lawns where one-half of the total amount available is applied in late March or early April, and the remainder in September or October. Uniform distribution of the fertilizer material over the lawn surface is highly essential since these materials move downward in the soil but do not penetrate laterally. Areas not actually receiving fertilizer will derive no stimulating effect. All lawn fertilizers may be applied safely without danger of burning, if spread at a time when the grass leaves are dry, permitting the material to sift through the leaves onto the soil. Artificial watering following fertilization is not essential where this practice is adopted.

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THROUGH THE INDIANA GREEN

Chapter I

INDIANA CLIMATE, SOILS AND SOIL MODIFICATION

BEFORE there was a hint of green on the hills this spring, at a time when the grass was brown, and many of the paved roads badly damaged by frost upheaval, we headed into Indiana to meet with a group of Northern area greenkeepers at Huntington.

Mr. George Holmquist, secretary of the Indiana Greenkeepers' Association, Mr. R. H. Sutherly, greenkeeper at the Municipal course at Peru, Mr. Roy Brown of the South Shore Golf Club, Syracuse, and Mr. Wayne F. Bennett, of Kokomo Country Club, went into session with us at the home of Mr. Holmquist. This first chapter of a full and detailed series on the subject of greenkeeping throughout Indiana is, therefore, drawn from the personal experiences of the group named.

The Indiana growing season was first discussed, and as it extends from March 15-20 through until late November, the state provides a long period of enjoyment for the outdoor enthusiast almost every year. The average temperature in the Northern and Central sections is approximately 75 to 80 degrees.

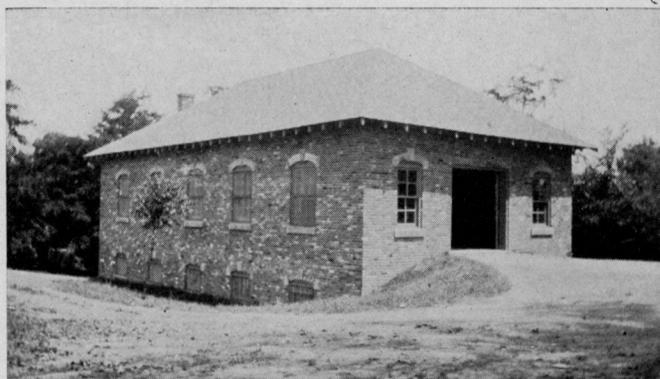
DIVERSITY OF SOIL QUALITY IN INDIANA

The rolling hills of the Hoosier state have been made famous by many an ardent pen, but finding what is termed "average loam" among them is nearly as fruitless as locating the proverbial needle in the haystack. Some areas are silt and sand, some heavy clay, others clay loam, and still others consist of muck and peat found on acres of drained swampland. Frequently a single golf course will show three or four distinct types of native soil, thus comprising a field of liberal education for the greenkeeper in charge.

The fundamental of soil management is the most vital item for consideration in growing turf grasses, but proper modification of soils used for both seed beds and top-dressing is no more a problem in Indiana than in any other section of the country where turfed areas are maintained. The varied structure and texture of the native Indiana soils, however, makes of the state as a whole an excellent testing ground in which to acquire a general knowledge of soil management. Few states offer more scope for resourcefulness in providing the right soil mixtures at the least expense.

TOPSOIL REAL PROBLEM AT KOKOMO

Mr. Bennett's problem at Kokomo can be solved in only one way,—buying topsoil by the yard. His soil is heavy clay, requiring a large percentage of sharp sand for putting green seed beds and top-dressing. He builds a regulation compost bed with layers of soil and stable manure, using whatever clippings and leaves that are raked up around the course to complete the humus content. Nearby his course a new fish hatchery is being built. A natural pool of good size was drained, and the black soil dug out to a depth of about two feet. Mr. Bennett has made use of this source of supply, and approximately twenty-five per cent of the topsoil used in his compost bed consists of it. The bed is spread in layers of topsoil mixed with twenty-five per cent black soil from the pool, and



Close-up of the new tool and top-dressing storage house on the Municipal course at Peru, Indiana.

about an equal bulk of stable manure. During the year the bed is worked over several times, and when well aerated and broken down, approximately forty per cent mason's sand is added at screening time.

Making use of soils dug out of low, swampy areas, or from pool beds such as has been described, frequently results in disaster for the turf grower. Such soils should be spread in a sunny location, well worked and aerated for a year or more before incorporating in a turf seed bed or used as top-dressing. Occasionally soils of such general description contain a large percentage of silt which, mixed with heavy clay, adds insult to injury. Mr. Bennett examined the pool bed source of supply, and found it to be a mixture of vegetation, sandy loam, and a small showing of silt. Proper handling made it safe for use, and the cost was limited to hauling.

Summing up Mr. Bennett's problems in soil modification, considerable resource on his part is indicated. He buys heavy clay topsoil, the only type to be had, at fifteen cents per yard, which represents his chief cash outlay in producing a compost bed. Both the black soil and the stable manure are free of cost except for hauling, and he also sends his own trucks for the concrete sand as needed.

FIFTEEN ACRES OF HUMUS AT SYRACUSE

Whereas Mr. Bennett at Kokomo is forced to buy topsoil by the yard, Mr. Roy Brown of the South Shore Golf Club, Syracuse, finds it by the acre on his course property. Not only that, but the topsoil available at South Shore is of a quality such as few greenkeepers have access to, fifteen acres of land, formerly a swamp covered with swamp maples and elms as original growth, cleared and drained years ago, first planted to onions, and finally to corn. As a source of top-dressing material, it is nothing short of a greenkeeper's dream of heaven on earth!

A mere description of Mr. Brown's source of top-dressing supply pretty well answers all questions as to how he produces fine playing surfaces. When we add that, but for one putting green, the native soil over the entire course is a light sandy loam, practically any experienced greenkeeper would be willing to stake out a claim at South Shore upon which to build himself a reputation for raising turf of a quality unexcelled anywhere.

That one putting green? Just a concrete illustration of how soil goes from one kind to another in Indiana. It's difficult to believe, but here's just one hard clay green on an otherwise sandy loam course, and hard clay is notably



This shows a creek which was enclosed in 24" cement tile in front of Number 12 green on the Peru Municipal course.

hard to manage. Not only is this single putting green a problem because of original finishing off with stiff clay, but its location as to natural passage of air currents is unfavorable. Hemmed in on three sides by heavy tree growth, hot and humid weather lays the green open to attacks of brown patch as does no other on the course.

This spring Mr. Brown has scheduled a number of improvements surrounding his one hard clay putting surface, and later on in the year a report of the several steps he will take to handle the situation will be published in *THE SURVEY*.

FOUR ACRES CULTIVATED AT PERU

Mr. Sutherly, at the Municipal course, Peru, contends with heavy clay, the modification of which is solved by way of a top-dressing "factory" of four acres planted to green crops plowed in, and the addition of approximately 40% sharp sand just before spreading.

The acreage is plowed in the spring and planted with soy beans. In the ordinary growing season, soy beans are in the "milky" stage the latter part of July. The crop is then plowed under, and another crop planted which is turned under in the fall. This constant cultivation has resulted in producing a topsoil of excellent quality and practically free from weed growth.

Most of the humus material Mr. Sutherly uses in making up his top-dressing mixture consists of so-called leaf-mold from the woods on the property, which was hauled out two years ago. It has been thoroughly worked and aerated in the sun, broken down to the point where it is easily handled and screened.

Every fall soil from the green-crop area and the pile of natural humus is hauled under cover, and mixed by hand shoveling. Approximately equal quantities of humus and soil, with 40% sand, constitutes the mixture which is screened during the winter months at convenient times.

NEW REPAIR SHOP AND STORAGE BUILDING

Considerable work has been done at the Peru Municipal course by the CWA, the FERA, and other divisions of relief workers, and among the many fine improvements made, the one closely associated with the subject of soil modification is a new building erected on the side of a steep slope, bank-barn fashion, which provides ideal quarters for mixing, screening and storing top-dressing.

The main floor of this building, pictured herewith, is used as a repair shop and for storing equipment. The

basement is half-floored with hollow tile, upon which section of flooring topsoil is dumped from trucks through a trap door overhead. Several hundred yards of topsoil can be stored, and Mr. Sutherly mixes and screens during the winter months to provide a supply ready for use early in the spring.

Nothing new was used in the construction of this building, with the exception of mortar, nails, cement and roofing, as all other materials came from an old abandoned schoolhouse. Machinery installed in the repair shop came from an old factory bought by the city, therefore the Peru Municipal course can boast of one of the most completely equipped shops for the care and repair of golf course machinery in the country.

A later chapter of this series will deal with machinery repair, taking the Peru shop as one example from which turf growers in general may determine the possibilities in their own neighborhoods as to adapting industrial machine-shop equipment to their needs. At no time in our history has there been so much equipment gathering dust in closed-down factories, certain items of which might be acquired at low cost to add to the equipment now inadequate for a thorough-going job of turf machinery repair.

CULVER COMPOST BEDS

Mr. Holmquist's greenkeeping experience is wide, and that in Indiana began at Culver Military Academy in 1922. The Culver course was designed by Langford & Moreau of Chicago, and Mr. Holmquist completed the construction and finished it off for play.

The first fall 400 loads of stable manure were spread over the nine fairways. Two hundred horses are kept at Culver, therefore humus for a compost bed was to be had for a short haul. The following spring the bed was started in layers of one-third soil, one-third manure, and one-third sand, in order named.

During the four years Mr. Holmquist spent at Culver, compost beds were built each year. They were turned over by hand spading, the depth of the bed as built being what may be described as "spade depth." Workers are able to cut down through all three layers in this type of bed, thus at each spading during the year soil, manure and sand are thoroughly mixed and aerated. Such low beds are not only easier to work, but owing to greater area of exposure to the weather, break down into good top-dressing material at a faster rate than those more aptly called compost "piles."

TOPSOIL BOUGHT BY THE ACRE AT FORT WAYNE

The native soil at Culver is heavy clay, but that at the Fort Wayne Country Club, where Mr. Holmquist spent the following six years as greenkeeper, is somewhat heavier.

There being no source from which to secure suitable topsoil on the course property at Fort Wayne, the club purchased the topsoil on an acre of land which had been under cultivation. This acre is what may be described as "average" loam. At the time of purchase, about three inches of sharp sand was spread over one-quarter of the area, and approximately nine inches of sand and soil removed for immediate use. The contract of purchase was made on a basis of a two-year limit for removal.

The sand used is called "torpedo" around the district, containing particles both fine and coarse.

TIME SAVING METHOD OF PREPARATION

The particular method used by Mr. Holmquist in providing a large supply of top-dressing in a hurry is most commendable. As the topsoil and sand were removed it was thrown into two long piles, with room between for a compost mixer and two men shoveling into the hopper, one on each side of the mixer. The mixer was run by tractor-power, and there being no revolving screen, a frame of 2x4 lumber was bolted together, size 7 feet long and 3 feet wide, and covered with what is called #3 mesh wire, commonly called hardware cloth. A stake was used to hold the screen in a tilted position. The fineness of the finished topsoil thrown through such a screen can be regulated by changing the slant against the stake.

During the summer, when weather permitted and spare time was available, a supply of mixed soil was screened and placed under cover, which provided top-dressings in the fall and early spring, when the soil in the field was too wet to handle.

Considering the foregoing method of securing and preparing topsoil at Fort Wayne on a cost basis, Mr. Holmquist said, "With the right equipment it could have been made cheaper, but when you consider that our cost was about \$1.25 per cubic yard, and there was a sale for any we could spare at \$3.50 to \$4.00 per cubic yard,—we were pretty well satisfied."

THIS SERIES COLLABORATIVE THROUGHOUT

Much has been written about the natural resource and versatility of the men who care for golf courses throughout the country. There still remains much to write. Following one greenkeeper around for a week or so would provide for readers of THE TURF SURVEY enough worthwhile material to fill a single issue. The purpose of this series is to follow the work of many greenkeepers straight "through the green," covering the highlights of the work they do from a daily, monthly, and a season-to-season standpoint. All following chapters will be written from notes taken by the editor of THE SURVEY at regular monthly meetings of the Indiana Greenkeepers' Association. In this manner, greenkeeping on a basis of consensus of opinion will insure recording the most efficient and economical methods now followed by the Indiana group.

The coming chapter outlined for the May issue will cover the daily, monthly and season-to-season care of teeing grounds. In such a record will appear many items of turf management which are suitable to apply on lawn and park areas of all kinds. In fact, questions will be asked as to specific problems which the Indiana greenkeepers have helped to solve for nearby owners of homes and estates.



Another view of the new tool house which shows a smaller building placed conveniently nearby, which is used for oil and gasoline storage.

CREEPING BENT IN OKLAHOMA

By PERRY MAXWELL

A GOLFING visitor of Oklahoma after an interval of some fifteen years would be amazed at the advancement made in her golf courses. Just a few years ago the courses were of the most crude type and the greens were sand. Enthusiastic as the golfers were, and longing for something better, they were convinced that climatic conditions would forever preclude their having anything but sand for putting greens.

"It can't be done!" they said, when grass greens were discussed.

FIRST PLANTING IN CIGAR BOX

The Bermuda fairways were wonderful but nobody gave more than a passing thought to Bermuda as a satisfactory grass for greens. Bermuda is rough in texture and has a short growing season in Oklahoma. However, I experimented with Bermuda greens at Ardmore, and in 1924 had probably the best 18-hole grass-green course in the state. This was the start, and a distinct improvement over sand.

Early in the nineteen-twenties, an experiment was made in Muskogee with bent, and I think that the first bent grass ever grown in Oklahoma was raised in Muskogee,—just a few plants in a cigar box.

The Muskogee experiment was carried out further on a lawn near the golf course, and one thousand square feet each of two varieties of bent from stolons were successfully grown there.

About this same time the Tulsa Country Club, under the leadership of the late Burt Collins, was carrying on extensive experiments with various strains of bent. I was able to procure from the Green Section stolons which Mr. Collins planted and nursed carefully through several seasons. It looked as if bent might be a success in Oklahoma,—and the golfers prayed.

SEASIDE BENT AT OKLAHOMA CITY

In 1925 or thereabouts, Cyril Walker was connected with the Oklahoma City Golf and Country Club, and he probably never before had seen Bermuda greens. Our Oklahoma golfers, not long off sand, were more than pleased to be on turf greens of any sort, but Walker thought something finer could be grown. Whether he knew of the experiments being carried out in Muskogee

What is Your Turf Problem?

Expert advice is to be had for the asking. Send your questions to *The Turf Survey*, 1900 Superior Avenue, Cleveland, Ohio

and Tulsa I do not know, but I do know that Cyril was convincing enough in his talk to the Oklahoma City Club to induce that body to invest one thousand dollars in bent grass seed.

This was a new strain of Seaside bent. The seed was planted on the old Bermuda sod and the results were extremely gratifying. The texture of the greens was so far superior to the old Bermuda that most of the golfers in the state were interested.

BERMUDA OF PERSISTENT GROWTH

Our difficulty was experienced in every case where the seed was planted on old Bermuda sod. The bent and Bermuda together did not make an altogether satisfactory putting surface. Too much variation in the texture, and on those places in the greens where the Bermuda was slow in coming in the springtime—maybe a few spots of Bermuda were winter killed—the difference was especially noticeable. The greens had rather an unattractive appearance.

In a few years Bermuda was definitely out as a putting green grass in this section. At any rate, it was out in the reckoning of the golfers and Greens committees. Unfortunately, however, it was not actually out. Every Oklahoma club which has tried to convert Bermuda to bent has experienced considerable difficulty. It do not think that up to now the conversion has ever been completely and satisfactorily made. Bermuda is hard to eradicate, once it is well established.

In the case of recently constructed courses the story has been one of almost unqualified success. After the greens have been modelled and a satisfactory surface obtained, fall seeding to bent has been universally successful in Oklahoma.

CARE OF NEW SEEDINGS

The main thing to watch is the planting time. Any date after September 15th, and not later than October 10th, should assure good cutting greens the following spring. All Oklahoma bent greens have been seeded and the strain of bent used has given satisfactory results.

The rate of seeding should be 5 pounds to each 1,000 square feet of putting surface.

In the fall the seed will generally germinate in 5 or 6

days. Care must then be taken to see that the young plants do not dry out. The plants are so tiny and the roots so small that drying of the top $\frac{1}{4}$ inch of the surface during the daytime may be fatal. Daily, and sometimes twice daily, watering of the surface may be necessary for the first two weeks. The plants are so tiny and delicate that it is essential that the ground be kept moist—not wet—until such time as the plants are strong enough to sustain themselves with less frequent watering.

As soon as the young plants are about an inch long they must be cut with a very sharp greens mower. One of the most important secrets of good putting green surfaces is frequent and close cutting. The experienced greenkeeper will know just what to give the green under the many weather and season changes. He will know when to top-dress, when to treat for brown-patch and dollar patch control, when to fertilize,—and more important perhaps, when not to fertilize. He will try to maintain a surface soil texture so satisfactory that the hit ball will bite and stop, without his having to keep his greens soft with excessive and possibly harmful watering.

TILE AND SURFACE DRAINAGE IMPORTANT

The question of drainage is an important one in discussing the growing of bent. Excess water must drain away quickly. In heavy clay soils tile drainage should most certainly be used. The depth of the tile and the distance between the lines of tile must be determined by the texture of the soil. In light sandy soils there will probably be no need for tile drainage, but care should be taken in the construction of the green to avoid low places or pockets which might hold water.

The building of bent putting greens in Oklahoma has been generally so successful that I look for an extension of those areas where bent may be maintained.

A map issued by the Department of Agriculture many years ago showed the Northerly limit of the Southern grasses and the Southern limit of the Northern grasses passing almost directly through Tulsa. Bent has been grown successfully several hundred miles south of Tulsa, and it may be that at no distant date, golfers all over the South will enjoy golf on the perfect putting green—*bent*.

AREAS REQUIRED FOR VARIOUS GAMES

Golf. 18 holes, 100 to 125 acres; mown fairways occupy 40 to 50 acres. 9 holes, 50 to 75 acres; mown fairways occupy 20 to 25 acres. Fairways, width 150 to 200 feet. Area of putting greens, 1-10 to 1-4 acre.

Polo. Boarded field, 300 yards by 160 yards. Field not boarded, 300 yards by 200 yards. Goals placed 250 yards apart.

Lawn Tennis. Court markings are 78 by 36 feet. Desirable total area per court, 130 feet by 65 feet.

Lawn Bowling. 42 yards square or larger. If flooded for curling, 45 yards square; curling marks or tees, 38 yards apart.

Baseball. "Diamond" is a square with 90-foot sides, diagonally 127 feet, 3 3-8 inches. Area of field varies, average 3 1-2 acres.

Football. Between goal-posts, 330 feet. Total advisable length, 400 feet. Width recommended, 160 feet.

Cricket. Field should be 150 yards square; pitch or distance between wickets is 22 yards.

Lawn Hockey. Length 110 yards by 50 to 60 yards wide.

Archery. Goals are from 30 to 100 yards from the archer. Allow an additional 300 yards at back and sides for safety.

Lacrosse. 100 to 125 yards long, 90 to 100 yards wide.

Croquet. 35 yards long by 28 yards wide.

Clock Golf. A circle of turf 20 to 24 feet in diameter is large enough.

Tether Ball. 20 by 20 feet.

EDITOR'S NOTE—Reprinted from the Newsletter of the Greenkeeper's Club of New England, February issue.

TREE PRUNING

By H. L. JACOBS

Arboriculturist, The Davey Tree Expert Company, Kent, Ohio

WHAT do you know about the pruning of shade and ornamental trees? Is it necessary? Why is it done? How should it be done? What effect will it have on your trees? Is it a good investment?

In pruning the shade and ornamental trees, you can pretty much forget any specialized pruning methods that are designed to encourage the development of blossoms, fruit or nuts. These last are for the most part problems of commercial orchardists.

What, then, are the reasons for pruning the shade trees that ornament your grounds? You may prune simply to maintain or train your trees to a certain definite size or shape. You may want to have them thinned out a little. Thinning might have several purposes. It would let the sunlight down into the tree and prevent many of the inside branches from being killed by too much shading. Thinning will let the sunlight filter through to the ground and permit a better lawn beneath those trees that normally cast a rather dense shade. Thinning will lessen the wind resistance of trees, making them less subject to storm damage.

An important part of pruning is to remove all dead, diseased or decaying branches. Dead branches soon decay, and decay is a major cause of serious tree trouble. You see, if you don't take out dead branches, the decay from them not only consumes these branches but works down from them into the good wood of the sound adjoining trunks. Here in the good wood the decay eats its way along until in time, whole branches or even the main trunks become hollowed out, weak and distinctly dangerous. Regular and thorough pruning will prevent the premature loss of many valuable trees.

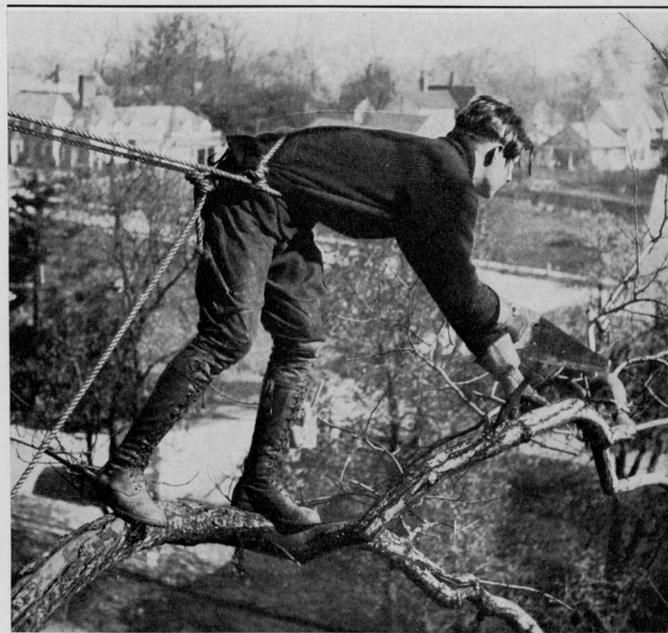
Pruning should be done to remove any storm-shattered or otherwise weakened branches that are hazardous and likely to come crashing down unexpectedly on people or cars passing below.

Often pruning off-sets root damage or encourages better vigor. There is, of course, a very definite balance between the size of the top and the extent and vitality of the root system. If root activity is stimulated it is reflected in rich beautiful foliage and in a marked increase in the growth of the branches. But if the roots are injured or suffering from lack of food or water, then they will no longer be able to supply nourishment to all the leaves, branches and trunks. Dead branches and signs of decline are soon apparent. Reducing the size of the tree by cutting back some branches and removing others will decrease the drain on the roots and re-establish a better balance between the roots and top while steps are taken to build up the health of the tree once more.

What most of us want from trees is cool shade and fine rich beauty. You can't have much beauty if unsightly dead ends of branches stand out against the sky-line or protrude like bony fingers through the lower foliage.

Pruning, then, has many purposes. It enables you to have gloriously beautiful trees and it is a means of keeping your trees safe, sound and healthy.

As to the technique of pruning, it is important to have



Properly pruning large trees is a hazardous business, except performed by men who have both knowledge and safety equipment to handle the job.

the work done by men who know their business, men who understand where and how to make the cuts, and who can do the necessary work without leaving a mutilated and deformed tree.

The men must know not only where to make cuts, but how to make them. No stubs should ever be left. The angle of the cut should conform to the natural path of sap flow for otherwise the bark will die back, healing will be impossible and decay will soon become established.

Cuts should be carefully painted with a good wound dressing; one that is not injurious to living tissue; one that is lasting, and will keep the wound protected against the entrance of decay.

With most shade trees pruning can safely and advantageously be done at any time of the year. Spring and early summer is an excellent time for pruning work since prompt healing follows.

From the standpoint both of economy and proper tree preservation, it is important to prune trees regularly, every year is possible. Such a program will result in a small annual cost since there will not be a great deal of work to be done during any one season. If the work is neglected then the expense of going over the trees will necessarily be much greater, in order to accomplish the pruning work itself. In addition, you will run the risk of having decay, disease, weakened branches and other similar troubles become established, which may require additional treatment and expense that could easily have been avoided by an annual pruning program.

After all, trees are a good deal like people. They live and grow and have their life functions and peculiarities much as we do. If we neglect our own health, we can expect to pay for it with illness and extra medical expense. If we check up on ourselves frequently, we can correct most of our ailments before they become serious and costly to treat. And so it is with trees. If you want the beauty of trees, then it will pay you to give them regular and intelligent care by competent and trained men.

STEEP CLAY BANKS

ON a trip over country roads this spring it was noted that saplings had been laid at an angle, and about one foot apart up the face of a steep clay bank along the roadside. The front seat passenger, an old-timer at greenkeeping, called our attention to this thick lacing of saplings and brown vines, saying, "That reminds me of the way I used to get a good catch of grass on unsightly banks like that around back areas on a course I was on in Pennsylvania."

We were left up in the air for a moment or two, when he pursued the subject. "You were going to ask me how in tunket I used saplings to hold a seeding, weren't you? Well, I didn't. I used oats."

Considerably relieved, but still cautious, we ventured, "Well, how'd you use oats?"

"Just scratched the surface, sowed 'em, with grass seed, let 'em get three or four inches high, then I cut 'em." He stopped again, and looked at the scenery for several minutes. Knowing his ways, we waited patiently to get the real lowdown.

"Hate to look at a bare old clay bank all summer," said he, filling his pipe. "Oats come up quickly, and cover it up for a while. Then the roots of the oats hold the grass seeding 'till it takes root,—and there you are."

And here you are, Mr. Reader, with two methods by which clay banks can be protected against undue wash.

The old-timer, recovering from the effects of a surgical operation, occasionally takes the aforesaid front seat for short trips with us around the Cleveland district, therefore in future issues we expect to gather from his long experience some worthwhile tips about this and that. Our friendship has stood the test of thirteen years' association. Two bones of contention we are engaged in gnawing at the present time are that he refuses to allow us to publish his name,—and that he considers it entirely unnecessary to break in a new pipe. Given time, we believe we can eventually break down his resistance on both points!

GOLDEN ANNIVERSARY CONVENTION

ASSOCIATION OF AMERICAN CEMETERY SUPERINTENDENTS

THE beautiful hall of mirrors on the fourth floor of the Hotel Netherland Plaza at Cincinnati, Ohio, will be an active thoroughfare during the Golden Anniversary Convention of the Association of American Cemetery Superintendents from August 23 to 27, this summer.

Exhibition booths run along both north and south sides of the hall, and practically all available space has already been sold.

Cincinnati brings back in its Jubilee Year this association which was inaugurated there in 1887. The attendance of superintendents and their families is expected to be large, as the dates were decided upon to be well in advance of the opening of schools this coming fall. Mr. H. W. Mueller, secretary of the Convention committee, advises that invitations to attend are being issued to 8400 cemetery superintendents throughout the United States and Canada.

Local arrangements are in charge of the Greater Cincinnati Association of Cemetery Superintendents, and Mr. George Dhonau is Chairman.

All inquiries should be addressed to Mr. H. W. Mueller, German Protestant Cemetery, Cincinnati, Ohio.

OUTDOOR RECREATION MEETING

Massachusetts State College, Amherst, Mass.

THE third conference on outdoor recreation held at Massachusetts State College March 12-15 was an outstanding success.

More than two hundred men have attended the Winter School of Greenkeeping since 1927. This year it was held in conjunction with the recreation meeting. New officers of the Alumni Association are as follows:

President, Clinton K. Bradley, Sr.

First Vice-President, William F. Nye.

Second Vice-President, Marston Burnett.

Secretary-Treasurer, Miss Elfriede Klauke.

Miss Klauke, now assistant to Professor Lawrence S. Dickinson, was elected an honorary member.

The General committee and class representatives from 1927 to 1936 are Arthur Anderson, Richard Finnerty, G. Moquin, Joseph Johnson, Joseph Whitehead, Art McClain, Dick Mansfield, Roger Henry, P. C. Terry, Jr., and Elmer Schact.

The Outdoor Recreation program was extensive, covering both exhibits and lectures on the subjects of camping, golf and parks, winter sports, community recreation, trails, hotels, archery, nature, hunting and fishing, mountaineering, horsemanship, water sports and forestry.

The Greenkeepers' Club of New England was active for months prior to the meeting, and contributed much toward the arrangement of exhibitions and plans as to the speaking programs.

ANNUAL MEETING

The Connecticut Association of
Golf Course Superintendents

At the annual meeting of the Connecticut Association of Golf Course Superintendents, held in March at the Brooklawn Country Club, Bridgeport, the following officers were elected:

President, F. Emeneger, Fairfield Country Club, Fairfield, Conn.

Vice President, D. McKay, Sunset Ridge Country Club, East Hartford, Conn.

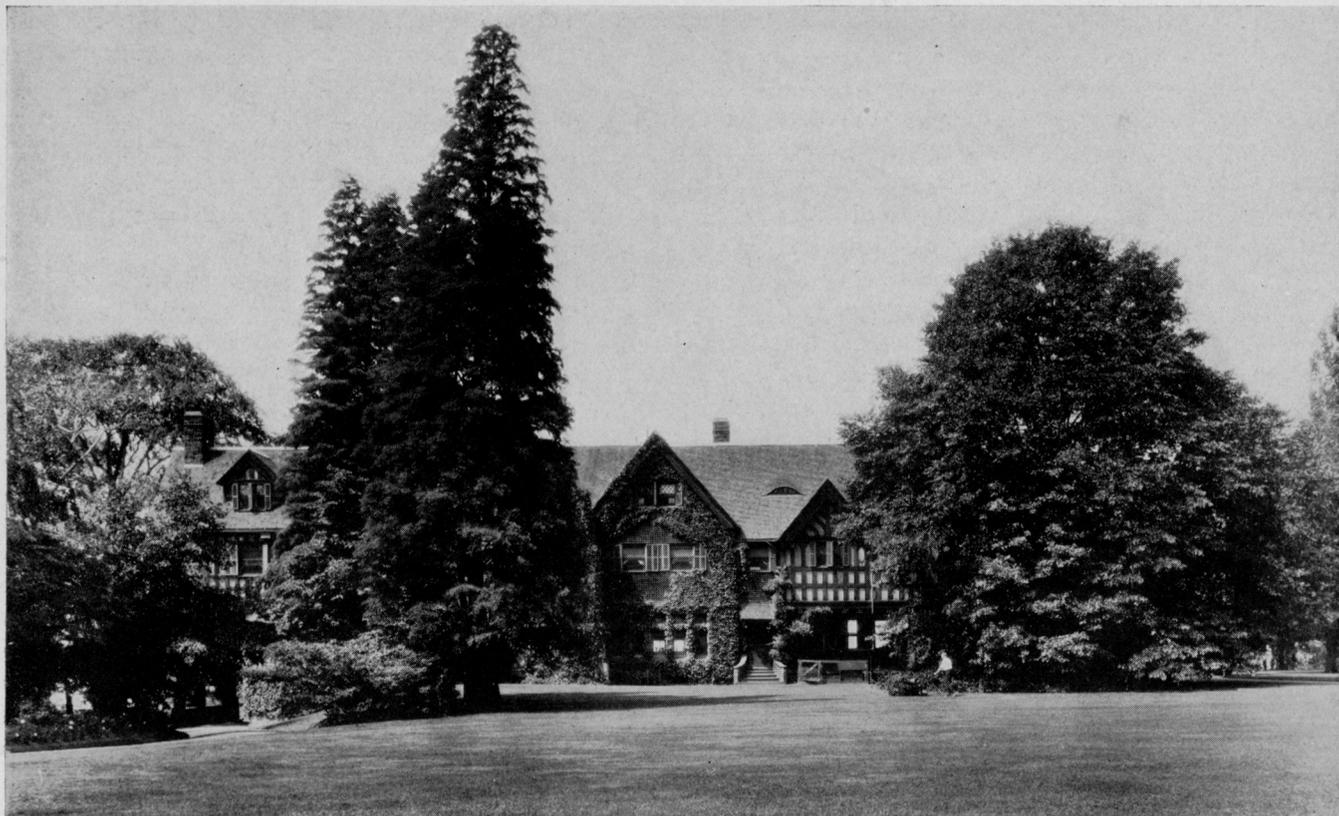
Sec.-Treas., C. Traverse, Mill River Country Club, Stratford, Conn.

Assistant Sec.-Treas., I. Pierson, New Haven Municipal Course, New Haven, Conn.

Mr. E. Hill, at Brooklawn, was elected to the Board of Governors.

One of the recent efforts of the Connecticut superintendents was that of arranging an exhibit for the Outdoor Recreation Meeting of Massachusetts State College, March 12-15. Mr. Traverse sent a photograph of the exhibit, which was received too late for publication in this number. Readers may look for it in the coming May issue.

The Connecticut Association was one of the first to offer cooperation when the Turf Survey came into being. Sample copies, together with a number of subscription blanks, have been mailed in accordance to request.



Estate of C. W. Bingham, Cleveland Heights, Ohio. An Ideal roller type power lawn mower is pictured in use on this beautiful lawn area.

SIMPLE SERMONS ON THE LAWN

NUMBER 2

Contouring and Surface Drainage

BEFORE entering into a discussion of finally contouring the rough surface of a new lawn, it is well to consider what is to be done with the subsoil which has been removed from the basement excavation in process of constructing the dwelling. Such soil is often carelessly handled, spread here and there over the surface, and becomes as a matter of course a part of the seed bed in which the lawn is later planted.

Frequently a home owner finds it practically impossible to hold a stand of grass on some areas or spots on his new lawn, and he wonders why the condition exists in spite of the re-seeding, fertilization and care he has given the grass. In many such cases, subsoil on or close to the surface is causing a regular "killing out" of his fine grass every season.

Soils thrown out of a basement excavation should be hauled off the place and dumped, unless used for underfills in grading, where they practically revert to their former position and are covered with a foot or more of topsoil. Due to their long exclusion from fresh air and sunshine, subsoils are toxic or poisonous in character, and entirely unfit for surface use where any green crop is to be grown.

PROPER TIME TO PLANT

There is much discussion, pro and con, as to the proper season of the year in which to plant a lawn. What is far

more important than the issue between spring and fall planting is the care exercised in doing the preliminary work before planting, whichever season is chosen in which to sow the seed. A good beginning is a job half done, and as drainage, both beneath and over the surface, is listed as the first requisite of a permanent growth of fine turf, the steps taken to insure perfect settling of the roughly contoured under-body of soil are of prior consequence.

BAD RESULTS FROM HASTY PREPARATION

Let us lay out for attention some of the turf troubles that are apt to follow as a result of a lack of attention to the details of firming the soil foundation, all due to or encouraged by the presence of pockets or depressions that show up on the surface of a lawn which has been hastily and carelessly prepared for seeding.

Take for instance, as first among the crop of yearly turf woes, the killing out of patches of grass which shows up after the frost leaves the ground in the spring. Most frequently such brown spots are found wherever depressions, either large or small, allow snow or rain water to collect and stand for days at a time. Late fall and winter rains, falling upon frozen ground, form such small ponds on a badly graded lawn, freeze over and smother, or "winter kill" the turf beneath. What seems to be a very slight depression on the surface may be a source of constant trouble from season to season until it has been

stripped, the surface raised with topsoil and re-seeded or re-turfed, all at considerable expense.

Snow Mold, a cool-weather disease of turf, leaving ugly deep scars that are difficult to heal, and frequently entailing the expense of re-turfing, gets its strongest foothold where its spores wash down from a higher surface and settle in a depression in the form of "secondary" infection.

Fertilizers which are recommended to apply on lawn surfaces are high in nitrogen content, and as a rule the nitrogen they carry is what is termed "quickly available." Unless watered in thoroughly as fast as spread, such fertilizers are apt to scorch and brown the turf badly. On lawns imperfectly graded, every depression that allows no immediate run-off of surface water receives and hold not only the fertilizer which has been spread over the low spot, but also a good share that is washed down from surrounding higher levels. Such overfeeding creates a lush or soft growth on the low spot which falls an easy prey to Brown Patch, the humid-weather turf disease that is unsightly and troublesome to keep from spreading over larger areas of the lawn.

Brown Patch is not the only summer sickness visited upon fine grass. There is "sun-scald," which browns and dries grass quickly, and its favorite point of attack is where heavy rainfall or over-generous sprinklings leave water that stands for some time on the surface under an extremely hot sun. Again we find the low spot, due to hurried settling and poor grading at the bottom of the trouble.

SUIT METHODS OF SETTLING TO SEASON

Surely so much evidence against hasty preparation, leaving air pockets in the roughing soil that later cause a collapse of the newly planted surface and consequent expense and trouble to correct, is proof enough that thorough preparation is worth the extra time which should be allowed for establishing a solid foundation for the turf seed bed.

There are two methods by which this may be accomplished. First, by grading the grounds and laying the rough contour over through the winter to allow the action of frost to eliminate air pockets and settle the surface for spring planting. Second, by repeatedly disking, cross-disking and dragging the roughing soil, with the extra aid of watering the area well the day prior to disking, if the work is done during a period of dry weather. The latter method should be followed during the summer prior to fall planting.

So far as preliminary work in lawn building is concerned in its relation to a choice between spring or fall planting of grass seed, frost is an economical laborer, working throughout the winter to encourage the furtherance of Nature's plan to bring forth fast growth in the spring. It follows that a lawn which is properly prepared for fall seeding is apt to run up heavier labor cost *to the point of planting* than is the spring planted lawn. This is due to the extra working of the soil necessary to settle the area and kill out sprouting weed growth during the summer season. However, such added labor expense is to some degree, and sometimes entirely, offset by the production of turf which is cleaner of weed growth as a re-

sult of fall planting. Weeds sprout less vigorously in cool weather, whereas grass delights in the fall season of plentiful rainfall and hazy sunshine, tempered by the fore-shadow of approaching winter. Each planting season has its adherents, for any one of a dozen reasons, none of which can possibly dispute the vital issue at hand, getting the surface well settled and free from air pockets, weeds and stones, to receive the turf crop.

Soils which have been plowed up, graded and otherwise disturbed, take some time to firm to a level which will remain permanent.

CLEARING SURFACE OF WEEDS AND STONES

If a month or six weeks can be allowed after rough grading, and before planting, three or four times over the surface at intervals of a week to ten days, with the disks set straight on the harrow, should kill out a large part of the weed growth and leave a reasonably well settled surface upon which to prepare the grass seed bed. Rocks and stones, pieces of wood and other debris, which the action of frost will tend to expose on the surface after the grass has been planted, should be faithfully removed as they show up while disking and dragging. Sometimes, after this has been seemingly well done, a hard shower of rain will disclose many stones that were missed, and picking them up wherever they show during the process of settling will quite likely save the shattering of cylinder blades on the mower later on.

Watering the rough grading down well the day before disking and dragging hastens settling and makes the job of disking considerably easier.

Wherever blue grass or bent flourishes, fall seedings should be made at least six weeks prior to freezing weather, and the first of October is generally considered to mark the limit of lateness for fall planting.

Many new real estate developments are laid out on land where the chief crop for some years has been weeds. The oftener such a surface can be disked and dragged before planting, the fewer weeds will mar the turf after it has started growth.

SAVE TOP SOIL BY SMOOTHING ROUGH CONTOUR

Often the largest single item of expense that is shouldered by a home owner in creating a new lawn is topsoil bought by the yard, hauled and spread for the seed bed. In this connection it should be remembered that any prepared soil spread for a seed bed will take whatever contour has been shaped on the roughing soil beneath. If the so-called "roughly contoured" surface has not been finally smoothed with a drag, holes and hollows that are left will swallow immense amounts of seed bed material when the dressed surface is evened up for planting.

METHODS TO PREVENT SURFACE DEPRESSIONS

As depressions in the finished surface are the bugbears to avoid in every way possible, it may be well to point out that some methods of handling the topsoil itself are responsible for their later appearance. Soil left in piles on a prepared rough surface will so pack the underlying earth that pockets in newly planted turf are the result. Topsoil should be spread as fast as delivered, and deliveries made too late in the day to be spread should be dumped

outside the lawn area near where they are to be spread the following morning. Delay in spreading freshly screened seed bed material is an expensive mistake, as such soil, unless stored under cover, becomes packed in the pile. Many times this necessitates re-screening, and so much re-handling that it is not only an expense but a nuisance as well.

Carts or wheelbarrows, loaded with soil and wheeled onto the prepared grade, are another source of embryo indentations in finished turf. Boards should be laid as a track for the wheels to distribute the weight of the loads transported over the surface.

ELIMINATE TERRACES WHEREVER POSSIBLE

Steep terraces have been for the most part discarded by the modern landscape architect, as they are more formal than beautiful, and constitute an exceedingly difficult surface to cut with a mower, as well as presenting an unnatural environment for grass growth. Holding turf on a steep slope is a never-ending job, as every severe storm takes its toll of soil from around the crowns of the grass plants. Such artificially and abruptly sloped areas interfere with the natural rise and fall of moisture in the soil, which is the chief cause of the starved and scrubby turf so often observed covering these man-made mountains on home grounds.

Applied fertilizers rarely remain on the steep side of a terrace long enough to become absorbed into the surface and available to root growth. There are frequent instances where such abrupt rises must be re-turfed every year or two, or re-seeded and covered with muslin to hold the planting until it strikes root.

Wherever possible the turf should be stripped off, and the terrace graded to a gentle slope, which can be economically maintained and easily cared for.

There seem to be four operations that may be emphasized as most important in roughly contouring a new lawn surface, i.e., avoidance of sharp slopes; assurance of perfect firming of the underbody of soil; thorough cross-disking and dragging at intervals to kill out weeds and mellow and smooth the rough surface, and finally checking the levels to insure perfect surface drainage.

Depressions that appear on a new lawn after it has been seeded are due to the same fundamental cause that fosters depressions in business. Both indicate a lack of foresight, which is the only safeguard against the evils they embrace.

EDITOR'S NOTE:—The coming sermon takes up the subject of the Grass Seed Bed, which includes methods of modifying native soils to suit the needs of lawn grasses.

THE TREEFORUM

A DIVISION OF INQUIRIES AND REPLIES

Conducted By H. L. JACOBS, Arboriculturist

I NOTICE THAT THE TRUNKS OF OUR MAPLE TREES HAVE LONG, DEEP CRACKS EXTENDING UP AND DOWN. These appear to have occurred recently. Can you tell what is wrong?

ANSWER.—*You have observed what are known as frost cracks. These have been unusually common and especially severe this past winter. They are caused by rather sudden drops in temperature. The outside layers of the trees cool more rapidly than the inside layers and, consequently, contract more rapidly. When the strain becomes too great the trees break open, often with a loud report. The cracks will close with the return of warmer weather, but there is some danger of decay becoming established in the exposed opening.*

A NUMBER OF OUR EVERGREENS, ESPECIALLY THE ARBORVITAE TREES, HAVE TURNED VERY BROWN THIS WINTER.—Do you think that they are dead?

ANSWER.—*The severity of the past winter caused the death of many trees but the probability is that your evergreens are in no danger. The leaves, or needles, give off moisture during both the summer and the winter. If the ground is so thoroughly frozen that the roots are unable to replenish the needles with the moisture which is evaporated from them, then, of course, the leaves begin to dry out and turn brown. Death follows occasionally, but not usually.*

WHEN IS THE BEST TIME TO HAVE TREES PRUNED?

ANSWER.—*Whenever the saw is sharp is still a good answer. Orchardists usually prune their trees during the winter, and with fine success. Shade trees are more commonly pruned during the other seasons, mainly because tree owners do not give much thought to tree pruning or other tree care during the winter months. If trees, like the maples, are pruned in early spring when the sap flow is excessive, a wound dressing will not stick to the cuts. This protective covering should then be applied later.*

IS IT TOO LATE IN THE SEASON TO PLANT DECIDUOUS TREES?

ANSWER.—*Now is a fine time to plant deciduous trees. The planting can be done with good success until the buds begin to burst. After that, special care has to be taken and losses increase.*

DO YOU ADVISE THE USE OF OIL SPRAYS IN CONTROLLING SCALE INSECTS ON MAPLES?

ANSWER.—*Oil sprays are likely to injure or even kill maple trees. Check the maples again. Scale insects seldom infest maples seriously.*

WHAT IS YOUR TREE PROBLEM?

Questions mailed to the office of The Turf Survey, 1900 Superior Avenue, Cleveland, Ohio, will be answered immediately, without obligation to readers.

A PILE OF CLIPPINGS

The Davenport Country Club, Davenport, Iowa, is the scene of great activity these days. Preparations are being made to have the course in the best condition in its history for the Western Open tournament to be held there June 19 to 21 inclusive.

Indications are that Indiana is becoming more and more "water-minded." John J. Meehan, trustee of North township at Dyer, has had favorable report on his request for a federal grant of \$100,000 with which to finish the construction of a proposed pool at Wicker park. At New Albany the Board of Recreation is attempting to get WPA funds to construct a swimming pool and make other park improvements amounting to a total of approximately \$27,000, while the city Board of Works at Brazil, Indiana, has appointed a committee to complete arrangements for constructing a municipal swimming pool similar to the one now being constructed at Washington, Indiana, at a cost of approximately \$36,000. New Castle plans a \$75,000 pool on part of the land donated by the Chrysler Corporation for new park improvement, whereas Kokomo, through means of a planned bond issue, hopes to complete its plans for a \$65,000 swimming pool in the near future. By June 30, Winchester expects to have all the work completed on its new \$31,000 pool and bathhouse.

From North Carolina comes the news of two new airports of considerable size. One, planned at Wilmington, will be constructed at a cost of \$53,140, and will provide employment for 347 persons over a period of four months. Title to the 123 acre site at Fletcher has already been taken by representatives of Asheville, Henderson, and Hendersonville, so that little now stands in the way of carrying out the plans for the new \$100,000 Asheville-Hendersonville airport.

Lester W. Herzog, New York State Works Progress Administrator, has announced the appropriation of over \$300,000 for the construction and improvement of sidewalks, fences, spectators' stands, baseball diamonds, tennis courts and other facilities at 30 parks and playgrounds in Yonkers.

Improvements in the form of new highways and extensive landscaping were recently begun at the Municipal Airport in Wichita, Kansas. Approximately \$120,000 is to be expended on this project.

Plans are under way in Okmulgee, Oklahoma, for a 160 acre city recreational center or park, using the Okmulgee Country Club as a nucleus. Included in these plans is a 10 acre lake for swimming and boating, a native stone bathhouse, and an 18 hole grass green golf course, with a pipe system for watering the greens.

Middletown, Ohio, city officials have been informed that WPA headquarters have approved a project for a new park on Yankee Road on ground deeded to the city for park purposes by the American Rolling Mill Company. The ground will be graded, landscaped, and a swimming pool and bathhouse will be installed at a total cost of \$40,000.

At Arcanum, Ohio, work has been started on the public project for Southern Darke County utilizing federal funds. It is the purpose to prepare the park for general use including tennis courts, horse shoe, etc., and install public playground equipment.

Announcement of a \$50,000 roadside park development program in 1936 has recently been made by the Michigan state highway department. These parks will be developed in eleven counties at sites where roadside springs are located. Plans include rustic shelter houses, foot bridges across streams, native tree and shrub plantings and development of artificial walks.

At Carlisle, Kentucky, E. E. Pfanstal, superintendent of the city schools, has received notice that funds for the project of constructing an athletic field have been granted by the WPA. A four acre track will be used. Arrangements are being made to include a football field, tennis courts and erection of a grand stand to accommodate 500 persons. The total cost will be about \$5,000.

The golf course in Elizabethtown, Kentucky, owned by Hays Burnett, has been leased for the year by a group of thirty-five Elizabethtown men, who pay a fee of \$20 each for the season. The club will have charge of the maintenance and improvement of the course.

Plans are afoot in Ansonia, Connecticut, for two new parks. Over \$41,000 will be spent on these projects which include a new swimming pool, bathhouses, a new athletic field, and construction of general recreation facilities.

Extensive improvements are being planned for the golf course at the South Bluff country club at La Salle, Illinois. Six new greens will be built and other work completed about the grounds in a move to put the course in a first class condition.

COMING FEATURE ARTICLES

Tile Drainage in Turf Culture

By Professor E. R. Gross, College of Agriculture, Rutgers University

Concrete Facts About Cement

Contributed by the Portland Cement Association, Chicago, Ill.

Velvet Bent at Yahnundasis

By Mr. Sherrill Sherman, Chairman of the Green, Yahnundasis Country Club, Utica, New York.

Tennis Court Construction

By M. D. Lamoreaux, Tam o' Shanter Country Club, Detroit, Michigan.

Landscape Design

By William E. Harries, Harries & Reeves, Buffalo, New York.

Memorial Park Maintenance,

By Mr. H. Frank Nichols, White Chapel Memorial Park, Clarence, New York.

Remarks About Repairs

By Mr. Ben W. Zink, Kirtland Country Club, Willoughby, Ohio.

Artistry in Agriculture

By Mr. William P. Bell, Pasadena, California.

TURF IN FLORIDA

By LANSON M. WHITTEN, Sarasota, Florida

OUR Florida golf courses are for the most part man-made, as we do not have the natural contours found farther north. As a result many courses have greens and tees which look very artificial. This is being corrected, and many of the newer courses in Florida present splendid architectural features.

The soils as a rule are very sandy, but it is surprising what results can be obtained by using water and fertilizer on our sandy soils. Some of the courses on the coast are built up by dredging and are pure white sand and shell.

Greenkeeping in Florida is an all the year around job. We use Bermuda grass for our summer greens as it stands the hot sun and heavy rains which we have during the summer months. For our winter greens we use Italian Rye and Redtop broadcast right over the Bermuda at the rate of 100 to 200 pounds of Rye and 10 to 20 pounds of Redtop. More than one seeding of Rye is usually needed, as some winters we have very little cold weather and the Rye burns out.

Bermuda seed is slow to germinate. Sometimes it takes as long as 60 days. It also needs warm weather as it will not germinate in cool or cold weather. The reason for this is that Bermuda seed is covered with a hard hull which resists water. This has been overcome by removing the hull, and the hulled Bermuda grass comes up in a week's time. In fact, last summer I planted nine greens, which were absolutely bare when planted, and had fine greens in six weeks' time.

Bermuda prefers sweet soil, as it will not do well in very acid soil. I use Colloidal Phosphate several times a year and find it the best and cheapest way to apply phosphoric acid. It also contains a high percentage of lime and other important plant foods.

We have to fertilize our greens heavily, as our soil is sandy, and the fertilizer washes away much faster than in clay soils. I am trying to use fertilizer materials which will help to build up sand from year to year. By using colloidal phosphate, humus and sheep or goat manure, then applying small amounts of high ammonia in the shape of Sulphate of Ammonia, Nitrate of Potash, Nitrate of Soda or Calcium Nitrate, we provide better water-holding capacity, and stimulation to grass growth.

Our fairways are mostly Bermuda and carpet grass, though some fine fairways in the central and northern part of the state are of centipede grass. Centipede is naturally a high-land grass as it does not do as well on ground which is not well drained. It makes a beautiful fairway on ground adapted to its use, stands dry hot weather, takes less fertilizer, water and mowing.

Carpet grass is best for low fairways as it needs plenty of water. It stands the packing of players using the fairways, as well as the fairway mower and tractor. In fact the more it is packed the better it will grow.

Bermuda, while it makes fine fairways, does not stand the tramping as well, unless watered.

Some other grasses are used, but Bermuda, carpet and centipede are the general standbys.

COST FACTS

By GUY C. WEST, EDITOR
NEWSLETTER

Greenkeepers' Club of
New England



Mr. Guy C. West

COST keeping of all work done by the greenkeeper's staff is often of help in presenting points, not only to the Greens Committee, but to other club committees as well. Most greenkeepers have, as part of their duties, the care of other game areas, maintenance of lawns, trees, shrubbery plantings, etc., and many items which have to do with club house operation, such as removal of waste or often repair work around the club house itself. The cost of all these various items should be known. We know of one greenkeeper, who, through cost keeping, was able to show the Executive Committee of his club that the greens staff did nearly a thousand dollars worth of labor on various items coming under club house service. This was surprising information, and resulted in a much different feeling among all concerned. Too often it is stated that the golf course, usually the main care of the greenkeeper and his staff, costs so many thousands of dollars, when a real analysis of figures, found by diligent cost keeping, will prove that the actual maintenance cost of the golf course is only 60-80% of the money spent under direction of the greenkeeper. Such facts are well worth knowing and pointing out to any club officials.

Cost keeping usually educates the greenkeeper to note and record keeping. The keeper of costs usually keeps other records which help him with his work. A daily diary of all that is done on the course will be of interest, if kept faithfully. Records kept of all fertilizing, composting, and chemical treatments for each green will do away with guesswork. Acidity readings of each green at start and end of season may be noted on the cards used for such records, with notes on condition of greens at various times during the season.

A record should be kept by the greenkeeper of the purchase of all equipment and supplies, and he should approve all bills of his department before they are paid by the club treasurer. He can then get his records for material costs to use with his figures for labor which he has from his payrolls. These figures, analyzed, are the basis from which he can report monthly to the Greens Committee.

Such monthly reports from the greenkeeper to his Green committee should give the monthly cost for labor, materials, (to include equipment and supplies), and the cost to date for these items in that fiscal year. A detailed list of costs for both labor and materials for the month should also be given, the labor being broken down as it is in the

cost system. Notes on the work done during the month, with costs of any items not shown, with comments, should likewise be a part of this report, which also furnishes the best place for the greenkeeper to go on record in regard to anything under discussion. Recommendations are easily made a part of such reports. The greenkeeper, keeping a copy of such reports for several years, has a mine of knowledge of his work during that period, and has a basis wherefrom he can draw up a budget. We will treat more fully of budgets next month.

EIGHTH ANNUAL SHORT COURSE IN TURF MANAGEMENT

By H. B. SPRAGUE, Agronomist
New Jersey Agricultural Experiment Station
Rutgers University, New Brunswick, N. J.

THE eighth annual Short Course in Turf Management was conducted by the College of Agriculture, Rutgers University, at New Brunswick, N. J., February 17-21, inclusive. Total of 41, including greenkeepers, seedmen, cemetery officials, and landscape gardeners, attended. The course is designed to provide fundamental information on the various factors involved in producing turf on golf courses, lawns, parks, cemeteries, and similar locations.

Members of the teaching and research staff of the College of Agriculture and Experiment Station discussed the following subject matter: Soil physics, chemistry and biology, fertilizers, lime, soil acidity, compost, organic matter, seed testing, soil and climatic adaptation of turf plants, the control of turf insects, diseases and weeds, renovation of poor turf, establishment of new turf, and care of grass lands used for recreation. The Agronomy Department has actively conducted research on this subject for more than ten years.

The large attendance at the course in its eighth year indicated that the subject matter is presented in



Group of staff and students taken at Rutgers during the eighth annual Short Course in Turf Management, February 1936.

a fashion which is of real value to those actually engaged in turf management. Abstracts for each of the 25 lectures were provided. The continuing interest in this subject has decided the College of Agriculture to offer the short course again in 1937.

Enrollment for the course this year is as follows:—

Name	Organization	Mailing Address
Anderson, John,	Essex County C. C.	Pleasant Valley Way, W. Orange, N. J.
Becket, John,	Yountakah C. C.	Nutley, N. J.
Bennett, Theodore		42 S. 5th Ave., Highland Pk., N. J.
Bergmann, Otto,	Otto Bergmann, Inc.	Midland Ave., Paramus, N. J.
Berndt, Max,	Clifton Nursery	10 Hillcrest Ave., Clifton, N. J.
Blakeslee, G. A., Jr.,	Chandlerin Seed Co.	601 W. 26th St., New York City
Brigg, G. L.,	Pine Valley G. C.	Clementon, N. J.
Cameron, John,	Yountakah C. C.	Nutley, N. J.
Casey, Edward J.,	Wykagyl C. C.	452 Milton Rd., Rye, N. Y.
Cockefair, A. C.,	Bloomfield G. C.	Bloomfield, N. J.
Daly, Charles E.,	Radburn Ass'n., Fairlawn, N. J.	
		152 Redwood Ave., Paterson, N. J.
Flemer, Albert B.		182 Meisel Ave., Springfield, N. J.
Fogarty, Edward,	Shackamaxon C. C.	Westfield, N. J.
Gagen, Timothy,	Hotel Champlain	Cutchoque, L. I., N. Y.
Gruger, Dorothy G.		Gladstone, N. J.
Heil, Ralph K.,	Cathedral Cemetery	
		Cathedral Rd. & Oram Blvd., Scranton, Pa.
Hogan, R. John		R.D., Salem, N. J.
Holcombe, John H.,	Glen Hills G. C.	Titusville, N. J.
Hubbell, Chapin,	Wepawaug C. C.	Orange, Conn.
Kapherr, R. E.,	Ridgewood C. C.	35 Marion Ave., Grantwood, N. J.
Ketcham, Darrell E.,	Taghkanic Hills C. C.	Craryville, N. Y.
Kievit, John C.,	Kievit Nursery	755 Lincoln Ave., Glen Rock, N. J.
Krumlauf, D. J.,	Westchester Co. Pk. Com.	8 Amackassin Ter., Yonkers, N. Y.
Kuhl, Richard W.,	R. H. Macy, Inc.	3540 Boulevard, Jersey City, N. J.
Lindsay, A. Y.,	Glen Ridge C. C.	1627 W. Front St., Plainfield, N. J.
Minwegen, A. A.,	Laurence Brook C. C.	New Brunswick, N. J.
Moore, H. L.		8 Morris Circle, Trenton, N. J.
Nye, W. L., Jr.,	F. H. Woodruff & Sons	30 Parkwood St., Springfield, Mass.
Orthel, George R.,	Woodlawn Cemetery	850 Longwood Ave., Bronx, N. Y.
Pendergast, N. R.,	Landscape Contractor	Tenafly, N. J.
Platt, P. G.,	Forsgate C. C.	Jamesburg, N. J.
Reid, Alex. H.,	Twin Brooks C. C.	250 Duer St., N. Plainfield, N. J.
Riley, Wm. R.,	Crestmont G. C.	West Orange, N. J.
Rogers, Oliver,	Forsgate C. C.	Old Bridge, N. J.
Sawitch, Jos.,	Kauneonga Lake C. C.	Kauneonga Lake, N. Y.
Scarlett, W. G., Jr.,	Wm. G. Scarlett & Co.	729 E. Pratt St., Baltimore, Md.
Schermerhorn, C. F., Jr.,	H. F. Michell Co.	518 Market St., Phila., Pa.
Schubkegel, Conrad,	Glen Ridge C. C.	Glen Ridge, N. J.
Teague, W. O., Jr.,	Hyper-Humus Co.	1421 Chestnut St., Phila., Pa.
Volz, Karl,	Essex County C. C.	Big Piece Rd., Caldwell, N. J.
Young, Earl,	Wyo Valley C. C.	75 Mill St., Luzerne, Pa.

PERENNIALS TO BUY THIS SPRING

- Hardy Chrysanthemums. The *Aladdin*, a new release, color burnished copper and gold. Extra hardy. Early fall bloomer.
 - Shasta Daisy. The *Chiffon*, new double form, with narrow, somewhat quilled petals around a dark eye.
 - Coreopsis. The new *Sunburst* is a double flowered form of an old free-blooming favorite, a real innovation which holds up longer as a cut flower than the old type.
 - Tritoma. A new variety of "red-hot-poker," or Tritoma, is called *Tower of Gold*, a beautiful deep yellow, most effective at the rear of a border.
 - Delphinium. Two unusual new white delphiniums are *Summer Cloud* and *Lady Beatrice*, both tall growers. *Summer Cloud* comes nearly 100% true from seed, and is pure white with light green "bees," or centers.
- Editor's Note: Information compiled from the "Flower Grower."

GRASS SEED MIXTURES

By C. B. MILLS

O. M. Scott & Sons Company, Marysville, Ohio

MANY folks have the idea that grass seed is mixed so a lot of junk, misfit and cheap varieties to say nothing of chaff and weed seeds, may find an inconspicuous as well as a profitable outlet. Well, unfortunately, that idea hasn't been too far wrong. Of course the seed business has no monopoly on the practice. Why should grass seed be denied a place on the so-called bargain counter now and then along with soiled shirts, faded ties and assorted whatnots? When seed is mixed as a subterfuge naturally it isn't going to be a bargain, but there is good cause for blending grasses although there should be a reason for the mixing—it should not be simply a means of dispensing an accumulation.

DATES OF MATURITY DIFFER

Different grasses mature at different times of the year. Some reach a state of maturity early in the summer, others linger on until midsummer while a third group comes into the ripening period in the fall. A mixture of such grasses, provided they can qualify as turf varieties, insures a continuous ripening process so that throughout the season, there is some species which is in top form. When only one type is relied upon, a specific maintenance program applicable to that single variety must be followed. We see this principle applied in the Bent putting green. Its upkeep is a science in itself. Surely to care for fairways in an identical manner would be costly and bothersome. For areas which cannot receive putting green care, a mixture is preferable with the type best adapted to local conditions, predominating.

EMPHASIZE VARIETY SUITED TO CONDITIONS

Now the reason for mixing grass seed in a specific manner is to first give emphasis to the strongest variety—to illustrate, where a clay soil exists Kentucky Blue Grass should predominate, whereas in a sandy soil Chewings Fescue should carry the load. But a second consideration must be the number of seeds in a pound. For example, if you mix equal parts of Kentucky Blue Grass and Redtop you are sowing three times as much Redtop as Blue Grass. The seeds are just a third as large. There are around five million seeds of Redtop to the pound and less than a million and a half of Kentucky Blue Grass. So to give Blue Grass proper predominance, there should be three or four parts to every part of Redtop. Creeping Bent may run as many as eight million to the pound. A further factor is germination. Kentucky Blue Grass with a germination of eighty to eighty-five is considered to be the quality equal of Redtop germinating ninety per cent or more.

Without attempting to tell you how to prepare grass seed mixtures, we stand ready to defend the theory of



Equipment dealers and members of the Indiana Greenkeepers' Association, taken last season at the Kokomo Country Club. Such demonstration meetings are held every year by local associations of greenkeepers, and have been increasingly successful from year to year.

mixing. But we carry no brief for the mixer who has one eye on market prices, the other on his variety inventory and his thoughts on the capacity of the container. That isn't blending grass seed—but applying the army method of making slumgullion.

WAYSIDE SIGNS

JERSEY COW REST ROOM—4 MILES

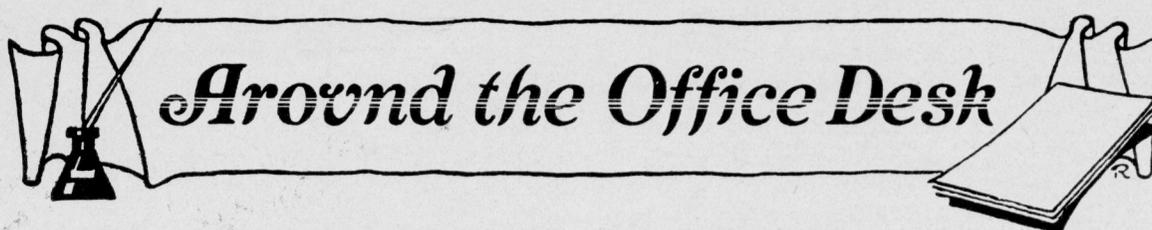
—
DANCING CHOP SUEY

—
DON'T CUSS—CALL US

—
TOURISTS 75c A NIGHT
BATH AND MEALS SERVED



The famous "Binnickill" hole at Shawnee-on-Deleware. A Worthington Overgreen power putting green mower is shown in operation.



Around the Office Desk

A "break-down" of the list of paid subscriptions received to date reveals the fact that park and cemetery superintendents are keenly interested in the educational opportunities offered by THE TURF SURVEY. On the desk at the moment is a pile of letters from them, out of which we select a few remarks sent in with their subscriptions. First, one from Mr. H. Frank Nichols, greenkeeper of long experience, now in charge of the landscaping at White Chapel Memorial Park, Buffalo, New York. Mr. Nichols says, "I guess that I was so busy telling others about THE TURF SURVEY at the convention that I failed to leave my own subscription at your booth, so was glad to get your reminder. This new cemetery demands extensive work, including seventy acres of turf. I hope I do not miss a number of the SURVEY, and you know I wish you every success."

Mr. H. W. Mueller, secretary of the Golden Anniversary Convention committee of the Association of American Cemetery Superintendents, writes, "I have just subscribed for your magazine, and believe it will be welcomed by all members of our association."

Mr. George Dhonau, chairman of the Convention committee, who has enlisted with his co-operation from the first, requested that we send him a supply of subscription blanks for use in taking subscriptions at a large meeting of the Cincinnati district cemetery superintendents this month. He writes, "I believe that all cemetery superintendents who see a copy of THE TURF SURVEY will subscribe for it. We have a meeting of local cemetery men scheduled, also I am to appear at another meeting of the Men's Garden Club, so please send me fifty blanks." Mr. Dhonau got the blanks, and there's no doubt in our minds that we'll hear from him to the tune of a high percentage of paid subscriptions from the Cincinnati district.

We are receiving a number of inquiries covering problems to do with turf culture, and answers will appear beginning with the May number. Readers are invited to come forward with any question they wish to ask, which if received prior to April 18, and of general interest, will be answered in the coming May issue.

The "Turforum" is absent from our pages this month for the reason that the Potomac River overflowed at flood tide, and left a deposit of putty-like top-dressing from six inches to a foot thick on the

garden which the Green Section had planned to use for most of the experimental work this summer. This aftermath of the raging high waters experienced this spring occasioned such hard and fast work in reclaiming necessary experimental areas that it was impossible to issue the copy in time for publication in this issue.

Mr. Custer Stallman, greenkeeper at the Durand-Eastman course, Rochester, N. Y., who wrote a most interesting story for the February number, complained bitterly last month because he had not received the first number. Both February and March issues were rushed his way, and now we have from him, "I read both copies, and want to say they are both fine. The March number is what they call a WOW! At a meeting of the Western New York Greenkeepers' Association March 10 your magazine was much talked about, and I think you will get a lot of subscriptions . . . I am contemplating buying a camera, and will take it upon myself to report for you some events around our district." That's the quality of co-operation which THE TURF SURVEY will bend every effort to justify, Mr. Stallman. Incidentally, if he has any trouble getting the right price on a camera, there's no justice in this here world, as the Durand-Eastman golf course appears to our eyes as seen through the lens of an Eastman Kodak.

Readers who may be interested in securing some velvet bent sod for experimental plantings may wish to get in touch with Mr. Roland F. Robinson, of Oak Lawn, New Jersey, who writes, "I am still experimenting with the No. 14276, the strain Mr. Pyle planted extensively at Goodwin Park, Hartford, Connecticut, and have been at it for five years." Mr. Robinson sent his subscription, expressing his belief that THE SURVEY is the most important work now being done for turf growers throughout the country.

Mr. C. L. Deming, young greenkeeper at the Grantwood course in the Cleveland district, says that he wishes us the best of luck in providing such a magazine as THE SURVEY, and that it has great possibilities.

Mr. W. H. Livie, who is to be in charge of the Lawsonia Hotel course at Green Lake, Wisconsin, this summer, called at the office to change his mailing address, saying, "I don't want to be without the

magazine a single month, in spite of the fact I've been a greenkeeper for a good many years."

Here's a short but pithy thought from Mr. Fred Peter, in charge of the Merrill Hills Country Club, Waukesha, Wisconsin, "I enjoyed your sample copy. THE TURF SURVEY is certainly *the* magazine needed for turf improvement."

Way back in 1927 and 1928 Mr. Al Schardt was in regular communication with our office, therefore we were mighty glad to hear from him since starting THE SURVEY along. Al should be labeled the "Flying Dutchman" of the Buffalo district, as piloting a plane is *his* kind of a good time. Once he flew over every golf course from Buffalo to Toledo in four hours which, as he says, is some kind of a record for a mere greenkeeper. What greenkeeper do you know who is a *mere* greenkeeper, Al? We challenge you by making the definite statement that there ain't no sich animal And as a mere editor to a greenkeeper who gets his perspective of the work of other greenkeepers from over the side of a cockpit, how about keeping your word to send us a story about proper grooming of the course for opening day? April 20 is the closing date. We hope you fly to meet it!

Mr. John Wilson, greenkeeper at the Windsor Park Municipal course, at Winnipeg, Manitoba, has what is known as a "camera" eye. He pointed out two typographical errors in the February number, thereby proving himself one up on us. "That is not intended as criticism," says he, "only to prove to you that I read it from cover to cover." We can see a little daylight ahead in the gloom produced by a consciousness of careless proof-reading, however, as we expect a story from Mr. Wilson for an early issue. We're now wearing a new pair of glasses, and intend to even up the score, if it takes all summer.

Professor E. R. Gross, Agricultural Engineer at Rutgers University, writes, "I feel that you have in THE TURF SURVEY a very worthy undertaking. Since I have received the March number I presume that it is your intention to continue sending me the magazine. I will appreciate it greatly if I may be so honored." Professor Gross' associate at Rutgers, Dr. H. B. Sprague, starts his contributions to THE SURVEY in this issue, and we have asked Professor Gross to favor readers with an article on the subject of tile drainage in relation to turf culture for publication in the coming May number.

Mr. Guy C. West, editor of the *Newsletter* of New England, believes that the March number "is a big improvement over the first issue, and well worth having." He continues, "I answered several questions while at Amherst relative to THE SURVEY, and have also mentioned it at two of our meetings." The number of subscriptions from New England



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which have been coming in during recent weeks shows a lively interest among Eastern greenkeepers. This we attribute to a recognition of the purposes of this publication on the part of just such wide-awake turf growers as Mr. West.

A goodly percentage of landscape architects are subscribing for THE TURF SURVEY, several recently from Oregon, Washington and California. A letter which has arrived as we write is from nearer home, however, and signed William E. Harries, of the firm of Harries & Reeves, Buffalo, New York. Mr. Harries writes, "I am very much impressed with the material presented, and if you can keep up the good work, I believe the publication will fill the void created by the discontinuance of the Green Section bulletins." That's a big order to fill, Mr. Harries, but we can see far enough ahead to be assured that material of unusual value and of more varied interest will be brought out in future issues. Many local associations of greenkeepers are co-operating to the fullest extent, and our plans include visits to two or three local districts every month. So far we are dated up until August.

Articles written by some of the "long-term" chairmen of Green committees throughout the country are now in work. There will be a contribution of unusually fine educational value from the Portland



A garden of bulbs and perennials similar to this offers a wealth of bloom at a minimum cost to maintain.

AROUND THE OFFICE DESK

(From Page 23)

Cement Association in an early number, which we hope to have with full illustrations in time for publication in May. A series promised by Mr. Edward B. Dearie of Chicago, on the subject of golf course construction, has been delayed because of Mr. Dearie's illness, but will be forthcoming for the May issue. Articles describing the turf work being done at some of the outstanding army and navy airports will be future features. These which are mentioned merely "scratch the surface" of what readers may expect in THE TURF SURVEY during 1936.

Suggestions on the part of interested readers are helping a lot to guide us in securing the best and most authoritative information to be had, the extent of which valuable suggestions must number by now in the neighborhood of one hundred.

Mr. Paul Tetor, in charge of the Ridgewood Country Club course at Ridgewood, New Jersey, did not take the time to write his approval of the March number. Instead, he wired as soon as he had looked it over, "Congratulating you on your March issue. Regards." Introducing Mr. Tetor to readers in general: He has everything in the way of personal appearance, and is also noted for an exceptionally well-groomed golf course. Some of the methods Mr. Tetor uses to keep his course slicked up to the Nth degree will appear in THE TURF SURVEY in the near future. Thanks a million for the wire, Paul. You would do that!

The aim of THE TURF SURVEY seems to be clear in the minds of readers in general. It is our job to produce each month a publication which is better than the preceding one. TURF, and the subjects allied thereto, can never reach the saturation point in relation to what information can be obtained and printed about them.

We hereby cast a vote of thanks to readers who have responded to our call for suggestions, and at the same time we ask YOU to let us know as soon as you have finished looking over this April number what particular subject you would like to read about in the coming months.

In response to the requests of three of our old friends who have asked us to publish some of the verse which used to appear from time to time in the old National Greenkeeper, we yield with the following effusion, and earnestly hope that readers in general will be able to bear it. Because of the fact that we swore off writing rhymes last summer, we find the only one at hand which has any relation to subject matter in THE SURVEY must be reprinted from the Western Reserve district garden publication, as Mr. Dean Halliday, the editor of *Your Garden and Home*, weakened to the extent of accepting it a while ago. Mr. Herbert Shave of Detroit, Mr. Joseph C. Ball of Pittsburgh, and Mr. George Holmquist of Huntington, Indiana—here you are:

THE ROSE GARDEN

*I am planning a garden of roses
Like a picture I found in a book,
With a pool and a fish and a lily,
Just to give it a "different" look;
And now I've just thought of a flower
My grandmother told me about—
Sweet William I'll plant for remembrance—
I couldn't leave that blossom out!
And hollyhocks, too, and some dahlias—
I simply can't do without these—
And just look at that marvellous tulip,
And those wonderful ruffled sweet peas!
I'm sure I don't see how I'll manage
To crowd in that phlox—but I will,
And some glads just in front of the trellis;
Now that doesn't leave one place to fill.
Yes, right here's just the spot for some iris,
And they'll grow almost anywhere, too;
I suppose I could hang up a kettle—
I do so love pansies, don't you?
Oh, dear, I just planned a rose garden
Like the one in the book, but you see,
With a pool and a fish and a lily,
It was not enough garden for me.*

WESTERN NEW YORK STATE NEWS

ACCORDING to Mr. Custer Stallman's report for March, the monthly meeting of the Western New York Greenkeepers' Association was held at Batavia. Mr. James Reid, president, was unable to attend, being on the sick list. The meeting was conducted by Mr. Elmer Hauss of Transit Valley Country Club, Lockport, N. Y.

The general discussion at the meeting covered the subject of prevention and cure of Snow Mold, the winter disease of turf which is quite prevalent throughout the district.

"Ethics for Greenkeepers" was the subject of a talk given by Mr. Charles Earle of Irondequoit Country Club, Rochester.

As April is a busy month for greenkeepers, the regular April meeting was called off, and the next will be announced by postcard.

Mr. Stallman, whose connection is mentioned in the Office Desk columns in this issue, remarks upon the fact that the meetings of the local association are well attended every month, which indicates a lively and constantly sustained interest in the problems members confront.

EARTH'S GREEN CARPET

Turf is the foreground of practically every beautiful man-made outdoor picture in America!

Turf is the background of emerald fusing into a tapestry of arresting loveliness the colors of flowering plants which surround the homes of all lovers of Nature.

Turf is the healer of Earth's wounds,—and many of your own.

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TABLES AND CHARTS SHOWING RESULTS OF RAPID CHEMICAL SOIL TESTS

EXPLANATION OF SYMBOLS AND TERMS

Truog Method for Phosphorus

Figures denote available phosphorus in pounds per acre.

Purdue Methods for Phosphorus and Potassium

Same symbols used to express both elements. The abbreviations have the following meaning:

Phosphorus and Potassium

V.L.—Very Low
L.—Low
D.—Doubtful
H.—High
V.H.—Very High

Simplex Methods for Phosphorus and Potassium

Separate system used for expressing each element. The figures following each letter signify pounds per acre, or parts per million. The abbreviations have the following meaning, and the figures in parenthesis express pounds per acre 6 inches.

Phosphorus

L-4—Low (4 lbs. per acre 6 inches)
L-8—Low (8 lbs. per acre 6 inches)
M-20—Medium (20 lbs. per acre 6 inches)
H-40—High (40 lbs. per acre 6 inches)

Potassium

L-0—Low (none)
M-5—Medium (40 lbs. per acre 6 inches)
M-10—Medium (80 lbs. per acre 6 inches)
H-20—High (160 lbs. per acre 6 inches)

Original Simplex Method

Water is the extracting agent.

Modified Simplex Method

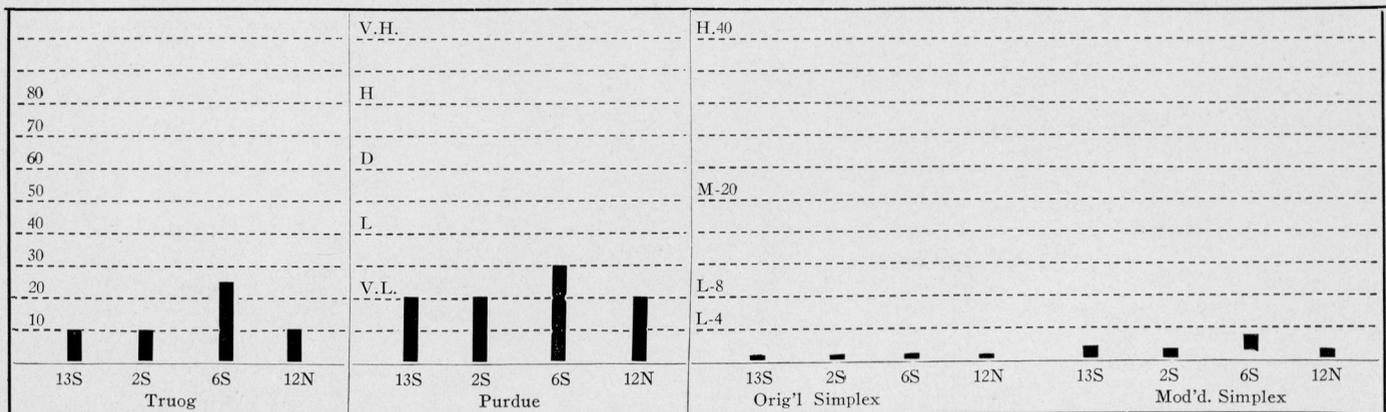
Dilute hydrochloric acid is the extracting agent. The method determines "Reserve" phosphorus and potassium.

TABLE I—AVAILABLE PHOSPHORUS

Comparison of Different Methods on Fairway Soils, Pickwick Golf Club, Chicago, Illinois, Truog, Purdue and Simplex Systems

Fairway No.	Soil Type	Avail. Phos. in Surface 3"			
		Truog	Purdue	Simplex	
				Original	Modified
13 S	Dark Silt Loam	10	V.L.	None	L-1
2 S	" " "	10	V.L.	"	Trace
6 S	" " "	25	V.L.+	"	L-3
12 N	" " "	10	V.L.	"	Trace

Soil Reaction ph 5.0 in each instance.



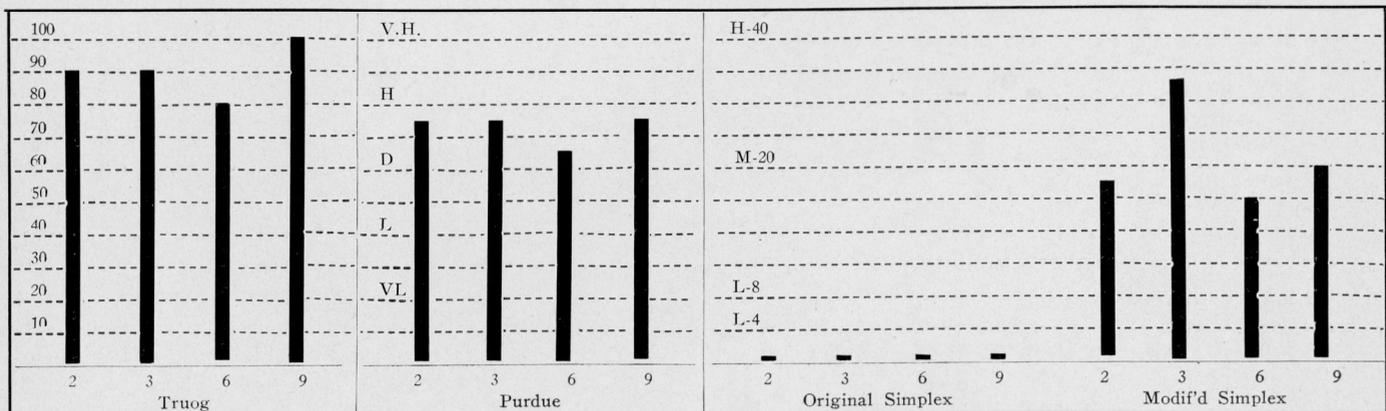
Explanatory Note: According to the four methods, all soils are exceedingly low in available phosphorus. These results should be compared with Table II.

TABLE II—AVAILABLE PHOSPHORUS

Comparison of Different Methods on Fairway Soils, Evanston Golf Club, Evanston, Illinois, Truog, Purdue and Simplex Systems

Fairway No.	Soil Type	Avail. Phos. in Surface 3"			
		Truog	Purdue	Simplex	
				Original	Modified
2	Dark Silt Loam	90	H-	None	L-16
3	" " "	90	H-	"	H-35
6	" " "	80	D+	"	L-12
9	Dark Loam	100	H-	"	M-20
11	" " "	80	V.H.-	"	M-20

Soil Reaction Varies from ph. 6.3 to 6.7



Explanatory Note: According to the Truog, Purdue and Modified Simplex Methods, these soils contain a reasonable supply of available phosphorus, and results are in fairly close agreement. The original Simplex Method gives entirely too low readings. It places these soils in the same category as the phosphorus deficient soil of Table I. Contributed by Dr. O. J. Noer, Milwaukee Sewerage Commission.

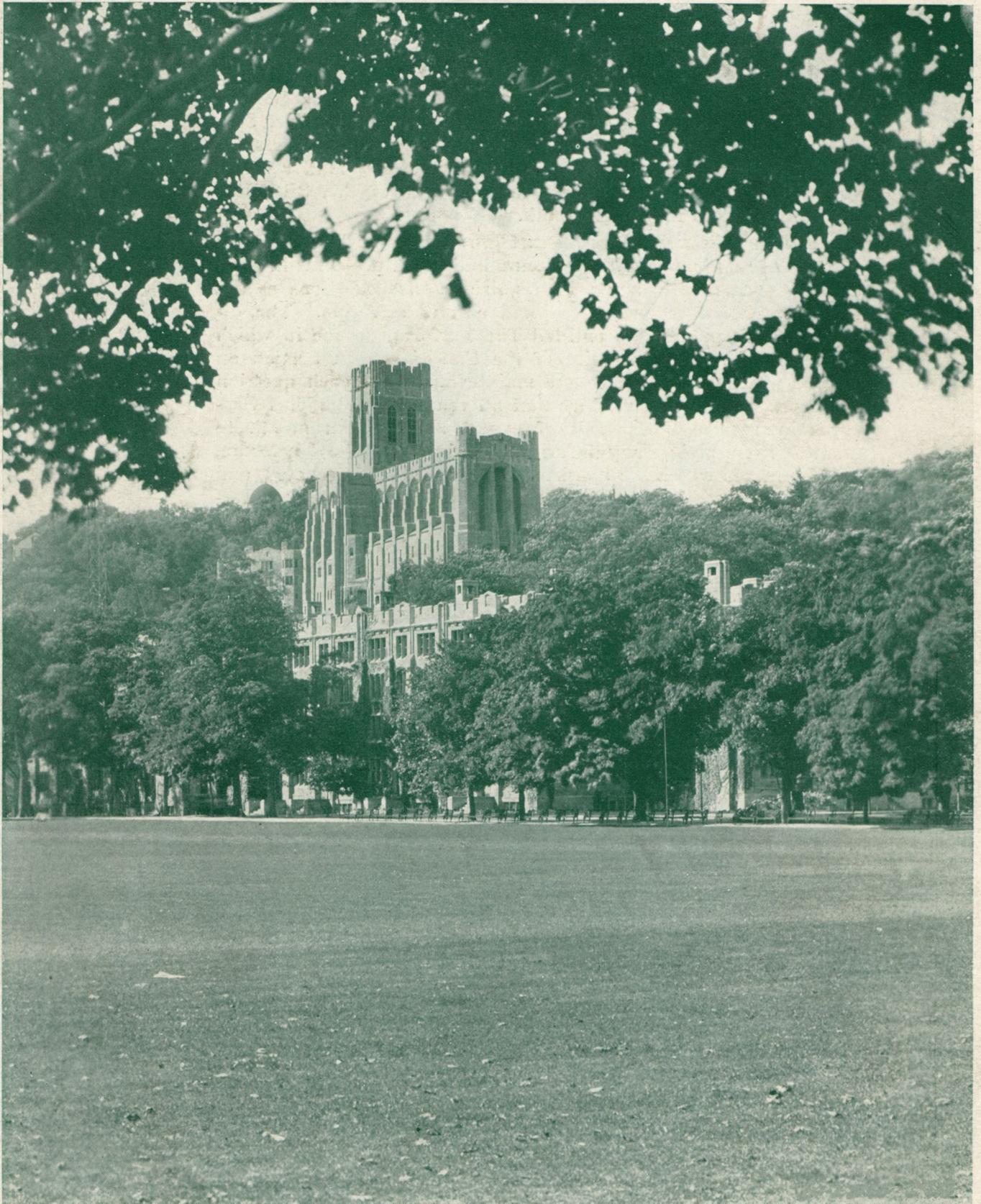
NOTICE TO READERS

YOU are cordially invited to write the office of The Turf Survey, 1900 Superior Avenue, N. E., Cleveland, Ohio, expressing your opinions and needs in relation to the reading matter which you would like to have appear in the pages of this SERVICE MAGAZINE from month to month.

The Turf Survey offers all turf growers in the United States and Canada an opportunity to discuss individual problems in open meeting each month, and such inquiries and suggestions as are received will be given prompt and careful attention. The division of this publication entitled The Turforum is one in which member clubs ask the advice of the U.S.G.A. Green Section on specific problems of golf course maintenance, and each question is answered in such a manner that all readers of The Turf Survey may receive the benefit of expert advice from month to month. In applying any information given in The Turforum, localities from which the inquiries were sent should be noted, and differences in soil and climatic conditions taken into consideration.

Arrangements have been made for educational articles to appear in following numbers of The Turf Survey covering subjects listed below. Subjects allied to turf growing are infinite in variety, therefore many others will appear in addition to the following partial list:

- Soil Modification
- Top Dressing Mixtures and Methods of Spreading
- Fertilization of Several Types of Turfed Areas
- Seeding and Stolon Planting
- Planting and Maintenance of Turf Nurseries
- Cutting and Laying Turf
- Drainage and Irrigation
- Turf Weeds, Diseases and Insect Pests
- Golf Course Construction
- Care and Repair of Machinery
- Golf Course Records
- Planting, Rehabilitation and Maintenance of Lawns
- Building and Maintaining Sand Greens
- Planting and Care of Native Trees
- Concrete Construction
- Selection, Planting and Care of Shrubbery
- Planting and Maintaining the Cut Flower Garden
- Road Building
- Turf Maintenance Short Cuts



THE CADET CHAPEL AT WEST POINT, AS SEEN FROM THE MAIN PARADE GROUND. NOTE THE CLEAN AND VIGOROUS GROWTH OF TURF ON CLOSELY-CUT AREA.