

dry weight. Poor crops in thin soils will often require twice as much, while good crops in fertile soils properly supplied with mineral matter will do the same work on half the amount of water.

For instance, Warrington reports that four investigators experimented with the water requirements of barley under different conditions, and found that it required 262 pounds of water to produce a pound of dry matter in one place, 310 in another, 393 in another and 774 in still another. The conclusion was reached that the two factors governing the water requirements was (1) the amount of water supplied; (2) its richness or poverty in plant food.

Stoddart observes that "only the very fine root hairs, located near the growing tips and extending but a short distance back of them, act as absorbers of plant food matter. The root hairs are long, slender, single cells. The walls are very thin, composed largely of cellulose and are easily pervious to liquids.

Under normal conditions of growth, water passes into the root hairs together with the dissolved plant food. The rate at which water enters plants depends upon the extent of the root system and the number of root hairs. Whatever we can do to insure a large number of roots and root hairs helps to make more and better plants.

The application of mineral plant foods to the soil in the vicinity of the germinating seeds, tends to promote early root growth. At the Iowa Experiment Station, Professor F. B. Smith has found that "the desirable effects of fertilizers on early growth, maturity and yield appeared to be in proportion to the development of the roots of the plants, and the greatest development of both primary and second-

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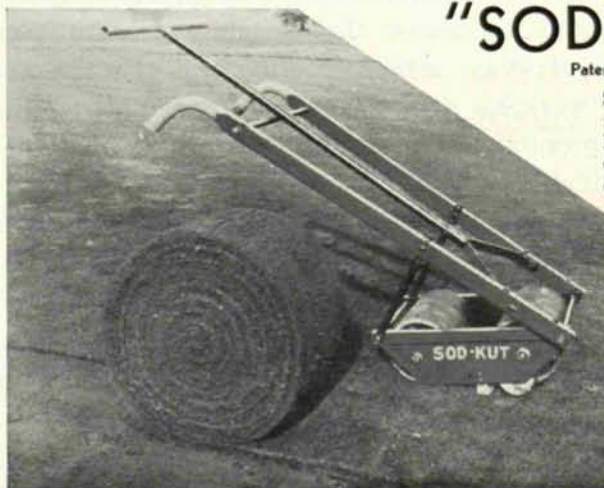
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ary roots was secured when the fertilizers were applied in the hill, thoroughly mixed with the soil."

At the University of Nebraska, Professor J. C. Weaver reported that roots in the fertilized zone of the soil tended to branch more freely and had an average of twice the number of root hairs as those in the unfertilized zone. According to these authorities, the way to increase the water capacity of plants is to apply mineral fertilizer to the soil.

To be continued.

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GREENKEEPING— TODAY *and* TOMORROW



By PROFESSOR LAWRENCE S. DICKINSON

Assistant Professor of Horticulture, Massachusetts Agricultural College;
Professor in charge of Greenkeepers' School, Massachusetts Agricultural
College; Honorary Member of the National Association of Greenkeepers
of America.

CHAPTER IV.—THE GROWTH AND PROBABLE FUTURE DEVELOPMENT OF THE GOLF COURSE FACTORY

IN PREVIOUS articles of this series I have tried to establish the fact that golf courses are in many respects analogous to factories. The growth of these factories has been considered only as an enlargement from a nine-hole course to an eighteen-hole course, and the future development is considered in terms of a possible twenty-seven hole course.

With a great many golf course factories the enlargement has been premature, being brought about by a minority of the club members; their arguments having been based upon over-enthusiasm, and in some instances selfishness. Probably over-crowding is the most convincing argument used by the factory promoters, and the desire to "keep up with the Jones'" the real motive.

The doubling of the factory plant due to over-crowding almost always leads to years of low treasury accounts, or the doubling (or more) of membership to help pay the cost of construction and operating expense. Counts and observations in favor of plant enlargement are taken Sunday mornings and holidays, when one expects to be crowded anyway, and do not represent a true statement of the actual playing traffic. Course enlargement under such conditions should be made only after very thoughtful consideration of all factors. In good business, factory enlargement is never made until the demand is imperative.

This premature enlargement of the factory is a most expensive overhead cost of golf course maintenance, and is the cause of many of the grey hairs of the chairman and his greenkeeper. It is

the cause of much inefficient maintenance, not because of the lack of ability of the superintendent or greenkeeper, but because of the factory plant, or physical structure of the course.

SHEEP MOWED THE COURSE

TWENTY-FIVE years ago sheep mowed the entire golf course (they do in some parts of England today). The greenkeeper was a first-class laborer and he had ordinary laborers for his assistants. The maintenance was apparently of very high quality as gauged by the standard that was demanded. Nature was not advised or hindered in her care of the turf.

Today the conditions are too well known to use space enumerating them. A fact that is frequently unconsidered is that the increase in the number of consumers (players) and the demand for a high grade product (playing conditions) has promoted the man who maintained the course from the grade of first-class laborer through the successive steps of craftsman, artisan, foreman to greenkeeper. His work has developed into a profession. With the promotion there has been the necessary requirement of increase in knowledge and ability, comparable to the promotion of a factory laborer to factory superintendent, such as technical and scientific ability with practical experience.

Many Green committee chairmen and a greater number of the influential players have passed through a similar experience of promotion in their chosen fields of endeavor. Do they appreciate or



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realize the same qualities in the greenkeeper or superintendent?

Golf courses have been developed to their present condition with the original factory, or factory alterations (usually an added maintenance cost) or a prematurely enlarged factory with the increased overhead costs. Many factories were poorly designed (for maintenance) and inferior in quality of construction, yet because of the greenkeeper and Green committee chairman the quality of the product is much improved.

WHAT WILL THE FUTURE DEVELOP?
 WHAT is to be the future development of the golf course factory and its management? Many forecasts do not materialize because they warn of dangers or cause a change in policy. The author does not attempt to forecast the future of golf any more than the honest stock broker does the future of any stock. This is his opinion.

The old original factories are breaking down under the strain of the present load and quality re-

quirements, and I venture to say that the next five years will see a steady increase in the number of golf courses requiring a new and better structure, built on the original factory site. This means a period of reconstruction work, much of which will be under the supervision of the greenkeeper. The reconstruction to bear the requirements of the next twenty years must recognize scientific principles.

On many of the younger courses (five to ten years old) the greens are failing physically because of hurried, careless and low price construction. These courses will have much reconstruction to do, and the cost will be greater than the reconstruction of the twenty-year greens.

NEW GENERATION OF GREENKEEPERS

THE profession of greenkeeping is entering the period of the end of the first generation of greenkeepers here in America, a most significant fact which clubs must be prepared to meet. The shrewdness and practical experiences of the passing generation must not be lost, but scientific and technical ability is almost a prerequisite for the replacing generation.

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tory product that is reasonable, and unless the external influences or professionalism (understand me correctly—not the professional) obtain a dictatorship, the standard will not change. There will be a more pressing demand by the players that their courses rapidly reach a condition nearer the standard, and then maintain it.

The business depression has already lowered the appropriations for maintenance, thus increasing the responsibilities of the greenkeeper, for a 10% reduction in budget means a 11% increase in efficiency and a 10% increase in loss by any error of judgement.

Undoubtedly golf course maintenance is entering a period in which more real value will be asked from each dollar invested. Sound economy will be necessary but I believe the days of stinginess in appropriations are past.

Thus for all connected with the golfing industry there appears to be ahead enjoyable times: Hard work, thrift, willingness to pay for real values, and golfing that will be fun. For all this, the golfing factory will be reconstructed, or newly built on scientific and technical lines, and should be maintained by skillful greenkeepers who have had prac-

tical experience and know the scientific fundamentals of turf culture.

Next Month—Chapter V—The influence of labor-saving machinery on golf course maintenance.

Cleveland District News

T By WALTER E. KNOWLES, *Secretary*

THE first of the 1931 out-door meetings of the Cleveland District Association of Greenkeepers, was held at the Portage Country Club, Akron, Ohio, on the 11th day of May.

A very lively business session at which arrangements for future meetings and the formulation of arrangements for the annual tournament for greenkeepers were made, was followed by a delightful lunch.

President Ermer, greenkeeper of the Ridgewood Golf Links, had arranged for a putting green mower demonstration to follow the lunch. This demonstration was witnessed by some forty greenkeepers and Green chairmen.

Looks like a busy season for the Cleveland district boys. On May 25th the Association meets at Oberlin Golf Club, Oberlin, Ohio; on June 8th at Manakiki C. C., Willoughby, Ohio, and the meeting of July 13th at Westwood C. C.



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Canadian News

By J. H. EVANS, *Golf Editor, Toronto Globe*

GREENKEEPERS and course superintendents of eastern Canada, particularly, are awaiting with some interest the first effort to be put forward by the Royal Canadian Golf association toward the development of a Green section.

In January, the golf association, after some discussion, formulated its program with considerable detail, and let it be known that there would be quarterly bulletins of value to the clubs to be issued before spring, the summer and the fall set in. Then a month ago it followed this with an announcement that the first bulletin would be issued within a few days.

With spring disappearing, the first bulletin of the Royal Canadian Golf association to be prepared by its committee of four laymen and then issued with the approval of the Federal department of Agriculture, has not yet made its appearance. If it has, greenkeepers have not seen it, nor been given an opportunity to study its contents.

Apart from the general interest which practical men may have in what may be suggested by laymen as a means of developing a Green section and educating greenkeepers in course maintenance, greenkeepers are also interested because they will in all likelihood at a meeting in June consider the advisability of seeking incorporation from the Federal Government.

A Federal charter might be construed in some quarters, on account of the powers it contains, as giving the greenkeeper the power which the Royal Canadian Golf association has conferred on itself through its second attempt at organizing a Green section, on this occasion with the cooperation of Provincial organizations.

Four laymen of Ontario and as many more of Quebec are to be responsible for the bulletin and the assistance which the association will provide to member clubs. None of these laymen in Ontario has as yet shown a disposition to supplement his knowledge of grass seeds, fertilizer and equipment by consultation with experienced course superintendents.

"A bulletin might be of some assistance to greenkeepers of the lesser known clubs. It might be of assistance if it had been issued some weeks ago when spring was commencing," was the observation made by W. J. Sansom, president of the Ontario Greenkeepers' association, after he and Bert Hawkins, secretary of the association, had been unsuccessful in their endeavors at locating a bulletin. "But if it does not appear before the spring season is through it can't be of much value until another spring sets in and then only if the conditions are identical."

The monthly meeting of the Ontario association was to have been held early in May, but was postponed on account of the amount of work which was engaging the attention of members. However, arrangements have been made for the June meeting, and at this gathering steps are expected to be taken toward securing the Federal charter.

The Provincial charter under which the Ontario association was secured was carefully scrutinized by the Provincial Secretary. On account of the scope of Federal charter it is believed that the Secretary of State will study the purposes of the greenkeepers' association with considerable care, perhaps to learn if it might become a labor organization at some time or another or a combine in restraint of trade.

A Federal charter would permit those securing it to operate from coast to coast. It would be far reaching, indeed, and those greenkeepers to whom it was granted might, with not a great deal of effort expand their association to a point whereby they would be recognized as the organization responsible for the education of the greenkeeper and thus it could easily come into conflict with the Royal Canadian Golf association or any other body with similar aims. Only a useful purpose would be served by any conflict, because the powers that be in golf who must sooner or later recognize the position of the greenkeeper.

* * *

There is some doubt whether the greenkeepers' association will hold another golf show this summer. Reasons given for the possibility of deferring an exhibition of equipment just after the Canadian National Exhibition when manufacturers will have their machinery in Toronto are the costs associated with a show and the fact that there is not much change in the character of machinery. Otherwise the program of the association will consist of monthly meetings until the season comes to an end as guests of clubs of the Province.

The climatic conditions leave little to be desired. Early April weather was well nigh perfect, but toward the close of the month it became cold with some minor frosts which did little damage, however. A little care and attention to greens and the appearance of warm weather repaired any loss which any club might have suffered. With little to concern him, the greenkeeper can devote his time toward the perfection of his organization.

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Pacific Coast Gossip

By ARTHUR LANGTON

IMPROVEMENT of present layouts rather than construction of new greens, tees, and fairways, is the order of the day on the courses of the Pacific coast at the present time. During this season, which in past years has seen intense activity in the way of new work, there has been no sign of clubs opening their purses for anything but absolutely routine work.

The reason for this reticence is obvious; although the country may be on the way out of the current financial quagmire, people will not begin spending money on golf courses until their financial stability is assured.

While this situation in which club officials demand that expenditures be cut till it hurts, is fraught with difficulties for the greenkeepers, it must not be forgotten that there is no time like the present for a course superintendent to prove himself worthy of the name. A number of courses on the Coast have discharged their greenkeepers or are contemplating doing so in a last desperate attempt to keep going.

Although none of these courses were very firm economic institutions in the best of times, their actions will serve as a warning to greenkeepers to demonstrate to their employers that the cheapest method in the long run is to retain them.

Western economy is taking various forms on golf courses. Shrubs, trees, and plants do not receive the attention that they once did. Golfers are experiencing more difficulty in getting out of rough grass which has not been trimmed. Only the most essential portions of the courses are receiving attention from the irrigation crews.

Flags are not changed as often as formerly, nor does the woodwork receive as much paint. Courses which already have them are finding hoseless irrigation systems tremendous labor savers, in some cases enabling greenkeepers to find other work for their night irrigation gangs. Nature during the past few weeks has helped out handsomely by doing the unexpected and sending enough rain to approach normal and surpass the total of last year.

However, a certain amount of activity other than routine work is going on in the Pacific area as is evidenced by the fact that the Red Hill Golf Club of Uplands, California, is putting down nine new greens with all the attendant improvements. Everyone who has driven into or out of Hollywood by way of Ventura boulevard, and nearly everyone has done this or hopes to at some time or other, has passed the Hollywood Country club which has one side exposed to the highway.

Recently the club sold some of its property bordering upon the boulevard and as a consequence is building three new greens. A number of people have expressed the hope that the course still will be plainly visible because it acts as a landmark to those who approach the Promised Land of Hollywood after threading their way through the devious paths to the north.

This is the season when brown patch begins to get in its dirty work again. Jack Wilson at the Rio Hondo course near Los Angeles, reports that of eighteen bent greens, only the three planted with the Cocos variety remained immune.

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Mid-West Notes

By A. L. BRANDON, Secretary

THE May meeting of the Midwest Greenkeepers' Association will be held the 25th at the Chikaming Country Club, at Lakeside, Michigan.

A joint meeting of the Board of Directors and the Executive Committee was called to consider the advisability of changing the name of this organization to some other name, which would perhaps better fit the type of work our membership is engaged in. Following lengthy discussions, the question was put to a vote. The officers attending this meeting were unanimous in recommending that the name Midwest Greenkeepers' Association be retained.

At the regular April meeting the membership also approved of continuing the use of the name Midwest

Greenkeepers' Association. Those answering roll call at the joint meeting at the Great Northern Hotel, Chicago, were:

BOARD OF DIRECTORS

Peter Stewart
Gus Graham
John MacGregor
Alex Binnie and Fred Ingwerson absent.

EXECUTIVE COMMITTEE

M. L. Bezek
Alfred Buller
R. N. Johnson
Fred Kruger
A. L. Brandon.

It was the consensus of opinions at this meeting that the name greenkeeper covers our type of work more thoroughly than the terms: Groundskeeper, Grounds Superintendent, Golf Course Superintendent, Maintenance Superintendent, or any such other forms or combinations of terms. The term greenkeeper is more explicit and proper in describing our profession.

It was pointed out that clubs would still appoint Green Committees and Green Committee Chairmen; also the U. S. G. A. maintenance division is the Green Section.

The word greenkeeper has long been associated with golf maintenance work and its meaning is being better understood by the golfing public than ever before and it is the duty of each greenkeeper to further this understanding. Also the brevity of the word greenkeeper is beneficial.

It seems to the writer that the term Golf Course Superintendent would apply better to the Chairman of the Green Committee than the Greenkeeper.

Publicity in the April issue of THE NATIONAL GREENKEEPER stated that the outdoor meets would be open to those interested directly or indirectly in golf maintenance work, this ruling has been withdrawn and the meets will continue as of the past years—Midwest members and their guests.

The officers at the joint meeting recommend that the initiation and annual dues be increased.

The weather of late has been unusually chilly, and warm weather will be needed to round courses in good condition.

New Jersey Notes

By JOHN ANDERSON, *Secretary*

THE Greenkeepers' Association of New Jersey held its regular monthly meeting at Damerest, New Jersey, on Monday, May 4. Fifteen greenkeepers met at New-

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ark and drove to the Aldecrest Golf and Country Club, where they were met by Mr. W. Bullock, one of the members of the association, who is in charge there.

Mr. Bullock showed us a real championship golf course. It reminded me of some of the courses in Scotland; all natural hazards and no sand traps. Mr. Bullock was in charge during the construction period and seeded his greens to Cocoos Bent, and they are a picture. It was the consensus of opinion that they were the best two-year-old greens the boys had seen.

The clubhouse at Aldecrest is not yet opened, so Mr. Bullock entertained the boys at dinner at a hotel in town at his club's expense, which was greatly appreciated by those present.

After the regular business was dispensed with, an article on Bacteria and their relationship to turf grasses was read by Frank Swehle of the Suburban Golf Club, Elizabeth, New Jersey. Mr. Swehle certainly knows his bacteria, and was accorded a hearty vote of thanks for his paper.

The next meeting is scheduled for June 15, at the Experimental Station at New Brunswick, where we shall meet the members of the U. S. G. A. Green Section, to view the turf plots and afterwards a dinner at Hotel Woodrow Wilson, where a number of speakers will talk on turf problems.

Minnesota Gossip



H. E. STODOLA
Secretary, Minnesota
Association of Golf
Course Superintendents.

THE Minnesota Association of Golf Course Superintendents held a record meeting of the year at the Keller Club, Saint Paul. Keller is to be the scene of the Saint Paul, \$10,000 Open in July, and the National Public Links Tournament in August.

The business meeting was held in the new clubhouse. All the members spoke their piece about the fraternal benefits of an organization of this kind and we are starting out the season with the slogan: "A bigger and better Minnesota Association."

Twenty-two members were present which included one new member. We are working hard for new members for the National Association. We do not recommend a man to the National until he has passed the rigid tests of our local.

After the business meeting the members inspected the course. They saw good specimens of snow mold on the Seaside bent greens. They also had a chance to

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study winter kill. The last week of cold weather has turned the greens off color in this part of the country.

More progress is being made on the University of Minnesota's Short Course. Mr. Coates, in charge of the Keller course offered a free ticket to each golf course superintendent for the Saint Paul, \$10,000 Open.

This meeting was very profitable and enjoyable. The next meeting will be held at the Somerset club, Saint Paul, Monday, June 8.

Indiana Greenkeepers Meet

THE Indiana Greenkeepers held their second outdoor meeting of the season at the Delaware Country Club at Muncie, Indiana, with Albert Esterline on May 4, 1931.

The golf course was examined very thoroughly and special attention was given to the greens.

At the noon hour a delicious luncheon was served in the club house and following the luncheon a business meeting was held.

Several important subjects were discussed, among these was the changing of our association's name "Indiana Greenkeepers' Association" to "Golf Course Superintendents' Association of Indiana."

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What About the Drouth?

THE drouth situation for 1930 and for 1931 up to the middle of February is summarized by J. B. Kincer, chief of the division of agricultural meteorology of the U. S. Weather Bureau in a bulletin issued by the bureau.

"The year 1930 was exceedingly dry and abnormally warm," Kincer writes.

The spring and summer combined, that is, the months from March to August, were the driest of record in Missouri, Illinois, Ohio, Kentucky, West Virginia, Virginia, Maryland and Pennsylvania, he adds. The rainfall in these nine states averaged for the six months only 58 per cent of the normal.

"For the year, as a whole, 40 of the 48 states had less than normal rainfall," he says. "The relatively driest state for the calendar year was Maryland, with 56 per cent of normal, followed by West Virginia, 59; Virginia, 60; and Kentucky, 61 per cent.

DROUTH CONDITIONS

Drouth conditions continued during January, 1931.

"This month," Kincer says, "was the driest of record over a considerable area of the East-Central United States, and had large deficiencies in precipitation nearly everywhere, except in the west Gulf area.

"Much of the interior valleys received less than one-third of the normal rainfall, while deficiencies of 50 per cent, or more, were rather general east of the Rockies, except in the more southern and northeastern states.

"For December and January, combined, Nebraska, Minnesota, Wisconsin, Michigan, Missouri, Illinois, Indiana, Ohio and Kentucky had the least rainfall of record, while for the period from October to January, inclusive, Michigan, Indiana, Ohio, Kentucky, West Virginia, Maryland, Pennsylvania and New York established new low records."

The mechanism of a drouth is well known to meteorologists but the causes for it are still a considerable mystery.

NORMAL WEATHER CAUSE

Normally, there is a succession of low pressure areas moving across the United States, these "lows" being followed by high pressure areas. As long as these areas continue to move across the country there is fairly normal weather. The general direction of movement is from west to east.

Drouths occur when there is a stagnation of the air, causing an interruption of the general movement of the "lows" and "highs" across the country.

"Rain is produced by a considerable cooling of a great volume of humid air," Kincer says.

"During the drouth of 1930 atmospheric pressure persisted relatively high in more southern, especially southeastern, sections, and low, with high temperatures, over the northern United States and Southern Canada. This general stagnant condition caused a nearly contin-

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uous flow of descending, hence dry, air from south to north over the surface of central and eastern United States.

"In other words, the normal movement of 'highs' and 'lows' was interrupted by a persistently stagnant state of the atmosphere.

"Conditions attending drouths are well known to meteorologists, but just why these should establish themselves, and persist, as in 1930, has not as yet been determined."

New Jersey Field Day

A field day program devoted entirely to turf culture will be held at the New Jersey State Agricultural Experiment station on Monday, June 15, 1931. The meeting is sponsored jointly by the New Jersey State Golf Association, the New Jersey State Greenkeepers Association, and the State Agricultural Experiment station. It is expected that a large number of people interested in producing and maintaining turf on lawns, golf courses, parks, etc., will be present.

The program will begin at 3 p. m. (Daylight Saving Time) on the experimental turf plots of the Agronomy Department at the College Farm, New Brunswick. Each of the several hundred plots will be labeled, so that visitors may draw their own conclusions as to the effects

of the various treatments and conditions. A discussion of the field experiments will be conducted during the afternoon.

At 6 p. m. the group will adjourn to the Hotel Woodrow Wilson, where dinner will be served at a cost of \$1.50 per plate. Following the dinner, there will be an evening program of talks on turf culture and a discussion of problems. Several speakers of national reputation will address those assembled.

Lakeland Municipal Course

The municipal golf course at Lakeland, Fla., is the rather famed Cleveland Heights course, built for the developers five years ago by Toomey and Flynn. It is a standard 18-hole championship course, rolling in its surface with no two shots alike. Not only is every green a different sort of a shot, but the course runs its way through a citrus grove so that in season players may pick oranges from the trees as they go along.

Dickinson Comes West

The next meeting of the Green Section of the Central Ohio District Golf Association, 513 Chamber of Commerce Bldg., Columbus, Ohio, is to be held at Scioto Country Club on June 12th, under the leadership of Prof. L. S. Dickinson. His subject is "Greens and Fairway Mowers."

This meeting is to be opened to the public, and would appreciate it if you would announce it in your next edition of the NATIONAL GREENKEEPER, stating that the only charge will be for lunch. It will be necessary, however, for them to make a reservation, so that arrangements can be made for lunches.



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