

"Greenkeeping Yesterday and Today"

Address By JOHN MORLEY, President N. A. G. A.
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ABOUT fifteen years ago, there were scattered on God's green acres in various parts of the United States a few hundred golf courses. The word "greenkeeping" was not generally known. About seventy per cent of the courses then in existence were under the direct supervision of professionals, most of them having received their training from the British Isles. In most cases, the methods which they had been accustomed to, owing to the difference in climate and soils in this country, proved very unsuccessful. They were to a certain extent handicapped, because very little knowledge was to be obtained, even from Washington, as to what should be the best methods to pursue. There were not more than ten per cent that would qualify as greenkeepers as the greenkeeper is known today.

Old Methods and Equipment

In those days, while we were fortunate to import good grass seeds from foreign countries suitable for golf courses, we were lacking in our ability to know how to take proper care of turf and produce good results. It is true that we had turf experts in those early days of greenkeeping. One of the leading turfmen was the late Fred W. Taylor of Philadelphia, who thought he had discovered that, by mixing clay, bonemeal and cow manure in a cement mixer and placing them in layer formation in the making of a putting green, it would solve the problem of raising ideal turf. This method as we all know proved a failure. In those early days there were very few pieces of equipment suitable to keep a course in excellent condition. First, we had to cut the fairways with a one horse mower outfit. Then came the gasoline mower that weighed nearly a ton with one single cutting unit. On an eighteen hole course, if we wanted to cut the fairways once in nine days, we were compelled to use two mowers, for one or the other was out of commission most of the time. Then came the sulky mower with three cutting units drawn by a horse which had to wear iron or aluminum shoes. If the horses were not flat footed when the turf was soft, they would dig the toes of these shoes into the turf, leaving the fairways full of small holes.

Ten Years of Real Progress

About ten years ago, golf in this country began to take rapid strides, and with this progress came improvements. But new courses multiplied so fast that it was impossible to secure enough men well versed in the art of greenkeeping. To a large extent we were very fortunate to secure men who had at one time been well

versed in farming and gardening. But they soon discovered that the methods applied to farming and gardening would not produce results for successful turf on golf courses. Each in his own way endeavored to find other methods, and with so many working along different channels we gradually commenced to get information that tended to create better and better working equipment. Since the World War golf courses have sprung up in leaps and bounds and from the few hundreds, fifteen years ago, they now number over four thousand. Out of the vast number of men selected to take charge of these courses, we have been enabled to produce a large number of successful men who are today well versed in greenkeeping. With the advent of the Green Section of the United States Golf Association, a few years ago, "greenkeeping" was placed in a position where it rightfully belongs, known as the Arts and Sciences. And instead of seventy-five percent of golf courses, which were formerly taken care of, fifteen years ago, by professionals, today over eighty percent of the courses are in charge of greenkeepers.

Science in Greenkeeping

It requires from three to five years to produce grasses that will stand the wear and tear of the players, and to a certain extent it also requires the same amount of time for a pupil to acquire sufficient knowledge to make him rightfully known as a greenkeeper. With this in view officials of new courses should take this under consideration. It also happens, during the early existence of a new course, that conditions are such that they often breed dissatisfaction among the members. No matter how hard the chairman of the green committee and the persons who have charge of the course try to correct conditions, they still fail to obtain results, owing to the fact that the soils especially used in the making of putting greens were selected and cultivated by golf architects to grow blue grass and clover instead of bents and fescues. For illustration, I can quote you two courses where this condition exists. Every method known has been tried with practically no effect. This fall both of these courses sent samples of their soils to one of the leading experiment stations conducted by the State of Ohio to have it analyzed. The answer they both received was to dig up several inches of soil and replace it with soil containing a certain amount of acidity, that the soils they had contained too much lime, or, in other words, they were too alkaline. But some will say "why don't they use an acid fertilizer and create the acidity needed?" Where phosphorous and potash predominate

in the soil caused by excessive lime formation, an acid fertilizer has very little effect, for the reason that when the temperature of the soil reaches a certain degree, the nitrogen from the contents of the acid fertilizer is almost immediately turned into ammonia—a volatile gas which escapes out of the soil.

Experimenting with Compost

Previous to the World War very little attention was paid to the creating or making of suitable compost, composed of soil, sand and manures. Most of us were using commercial humus, which proved to be very expensive. About this period I commenced to make compost of my own. But I found it difficult to secure suitable stable manure. In looking over the advertisements in one of our daily papers I had discovered that a certain livery stable wanted to contract their manure for one year. Upon investigation I found that the bedding was composed of oat straw. I signed the contract. About two weeks later the teamster brought to the club manure made from wood shavings instead of oat straw. I had signed the contract and knew that I would be compelled to haul it away from the stables, so I tried to dispose of it to farmers. However, when they were informed of its contents, they wouldn't take it. I knew that manure composed of wood shavings produced acidity, but did not know at that time that it would be suitable for golf grasses. I composted it, and after turning it over twice, and it had become one year old, I experimented with this compost upon one of the putting greens. In a reasonable time I noticed a slight improvement in the turf. About one month later I topdressed this same putting green again with the wood shaving compost. It did not take long before the chairman of the green committee and members of the club observed the wonderful improvement in the turf. I afterwards gave the rest of the putting greens the same treatment, and all of them responded the same as the first putting green. Then I began to realize that I had created an acid condition in the soil and that bent and fescue grasses thrived well in it. However, having failed to renew my contract for more shaving manure, and having used up all compost that was composed of it, I began to look around for an acid fertilizer.

Tries Sulphate of Ammonia

It was suggested to me to try sulphate of ammonia. I did, on my own lawn, and burnt nearly all the grass. After several attempts I finally discovered the proper amount to use. Having previously created an acid condition in the soil, I was able to get immediate results. I have been using ammonium sulphate for over eight years, and lately I was of the opinion that I was getting too much acidity into the soil. During the season just past, in order to keep the turf in good condition I was compelled to nurse it more than usual. The chairman of our Green committee suggested to have the soils of

the putting greens analyzed, which I did—and I was surprised to learn that most of them were only slightly acid, and that two of them were neutral. This demonstrates that you can not by the continuous use of sulphate of ammonia get too much acidity in the soil. This also shows that when the soils obtain a certain degree of acidity, an acid reaction takes place, and gradually brings the soil back to neutral—its former condition.

We know that the bent grasses, whether they are raised from seeds or stolons, have very shallow roots and remain close to the surface, and we are informed that fertilizers, such as nitrate of soda, cotton seed meal, sheep manure, and several others, contain a large percent of nitrogen. After these have been applied to the turf and receive a heavy watering either by rain or sprinkling, the contents of these fertilizers are forced too deep into the soil, and very little of it is able to reach the roots of the bent grasses. We often wonder why foreign grasses thrive better in our putting greens than bent—one of the chief reasons is that they are getting the benefits of the above named fertilizers—which the bents are not getting. Sulphate of ammonia is a very light nitrifying gas and remains close to the surface. On this account it has a tendency to starve out a large number of foreign grasses and obnoxious weeds.

Worms Dislike Sulphate

For the past ten years I have never used any worm eradicators, although our course is fairly alive with angle worms. The first two weeks in the early spring and in the late fall we get quite a number of them. But as soon as the soils in the putting greens warm up, the angle worms disappear. They do not like to work in soils that throw off nitrogen gas from sulphate of ammonia. The first two weeks that the angle worms are throwing up worm casts prove to me that they are beneficial to our putting greens. They create numerous channels in the soil, so that later in the season water will penetrate quicker into the subsoil, and allow the energy from the sunrays to draw it up to the tiny hair-roots in the form of a vapor to the grass plant when it is needed, when conditions are such that the capillary movements go up and down in the soil freely. It is a good plan to water heavily and seldom; when we water often and lightly the grass roots come to the surface for water when they should be going deeper into the soil.

Encouraging Nitrifying Bacteria

If I were to be asked "why" I make compost, my answer would be that one of the principle reasons is to breed into the soils nitrifying bacteria. These bacteria take the organic material which the compost contains, help to decompose it, and release the various fertilizing elements, so that when they are applied to the soil intended to topdress they become immediately available as plant food for the grass. Another reason "why" we

make compost is to topdress the putting greens with a porous soil, in order to make the putting greens true.

A Probable Cause of Brown Patch

On most of our up-to-date courses I believe that we are getting our putting greens too rich; we are getting too much organic matter into the soil, and we are often using the compost before it has had time to decompose. I believe that this may be one of the chief reasons for the breeding of fungi, or what is known as the brown patch disease. When this organic matter from the compost, that has not had time for the bacteria to tear the various elements apart for available plant food, is placed on the putting greens, and later washed into the soil, it lies there as decaying material, which later produces a poisonous substance in the soil. When the humidity becomes heavy for several days it causes the surface of the soil to sweat and prevents an equal distribution of air entering and leaving the soil. But on several portions of the turf on the putting greens there are what we may call air pockets, which the humidity has failed to close up. The poisonous gases in the soil escape through these air pockets, causing the rapid growth of mycellium, which has the appearance of cobwebs on the grass. If these are not destroyed before the heat of the sun strikes them, the pollen from this mycellium spreads out and closes up the pores of the blades of grass, preventing the upper part of the blade containing pores to obtain oxygen, and the lower part of the blade, carbon. This causes the grass to wither and die. We may often check the fungus disease by observing at the commencement of heavy humidity that the putting green mowers are not cutting the usual amount of grass. It then becomes necessary to apply at once a slight application of a quick acting fertilizer. This has a tendency to strengthen the blades of the grass, and aids in helping to throw off this poisonous matter.

Charcoal Improves Putting Surface

There is another important item relative to greenkeeping, and that is to know the best methods to keep the putting greens in a good porous condition, so that when the player makes a good drive on the putting green, the golf ball will bite well and not bounce off the green. We often create this condition by the use of pulverized charcoal, especially where silt and clay loams predominate. It tends to make the surface firm and porous. During the playing season, especially should it be a dry one, it helps to prevent the surface of the soil from baking and cracking open, thus preventing the nitrogen gases from escaping out of the soil. After a heavy rain or watering charcoal expands, thus allowing more water to enter into the subsoil.

Golf Grasses

The most important grasses used on a golf course are the various bents, fescue, red top, bluegrass and poa an-

nua. In the northern latitude the bents are the favorite grasses so far as putting greens are concerned. However, since the World War we have not been able to obtain a good variety of bent seed. This has caused a good many courses, which have been built since then, to plant their putting greens with red fescue. But owing to the fact that it will not stand close cutting, it has proved very unsatisfactory. Red top often makes a fine appearance the first season, but in the second season it has a tendency to die out. The best place for the bluegrass is on the fairway, although it does not do well in extreme dry weather. *Poa annua* will make, if properly taken care of, the finest turf for putting greens—however, it is very treacherous. It requires lots of water and feed, and must be cut very close when it is seeding heavily. I would recommend that *poa annua* be used only by competent greenkeepers.

Time will not allow me to enter into all the ramifications of greenkeeping. I am well aware of the fact that it is difficult, if not impossible, for any one at a distance to give advice of any real value, much less to dictate any hard or fast rule as to what may be right or wrong for others to do. Experience teaches us to appreciate the fact that what may be the right thing to do in one place may be the reverse in another. Therefore, I have tried to outline methods that have proved satisfactory to me on a number of courses which I have visited in an advisory capacity.

Nature Never Subjugated

I have endeavored to lay before you our methods of the past and present regarding greenkeeping. What the future has in store for us, I do not know. But I am inclined to believe that with so many new courses being constructed with the intention of further progress, the greenkeeper, who is aiming to give the services that will be demanded, will be compelled to be well versed in botany and plant pathology. While we all realize that the best education he may get is from practical experience, yet I am of the opinion that knowledge along theoretical lines helps.

In the many callings of life there are many vocations where one can, by perseverance, industry and skill, reach the top of the ladder of fame, but greenkeeping is one of a few where it is impossible to reach it, for nature, Mother Earth, will not let him. She will only allow him to go so far and no farther. She is looking forward to the protection of future generations, and when we endeavor to try and get ahead of Nature, she penalizes us by producing insects, bugs and various fungus diseases, in order to check us. While it is true that we will eventually learn to eliminate these pests, yet we are apt later on to get diseases of the turf more disastrous. Greenkeeping really belongs to the Arts and Sciences—for Art creates and Science discovers.