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DEEP SIGNIFICANCE IN RECENT

# Turf research

By B. R. LEACH

THE outstanding paper of the series delivered at the annual meeting of the Green Section held in New York in January last was given by Doctor John Monteith, Jr. Dr. Monteith is well known to the turf-maintenance world as a plant pathologist and specialist in the control of turf diseases. In this paper he outlined the scope and results of two years of experimental work in the control of brown-patch by the use of lime. In experimental plots treated with ground limestone at the rate of one ton to the acre (roughly five pounds per 100 square feet of turf) the disease failed to develop whereas unlimed turf in immediate proximity to the limed turf was virtually wiped out by the disease. The Doctor's address was well illustrated by a comprehensive series of lantern slides. Needless to say the paper made a profound impression upon the gathering of turf enthusiasts present at the meetings. It would appear, after several years of intense misery with the brown-patch scourge, culminating in the

debacle of 1928 when almost all the golf courses in the East were rendered *hors de combat* by this disease, that relief is in sight and incidentally by the simplest of methods, namely the application of ordinary ground limestone.

While the first reaction to Monteith's work will be a feeling of intense relief in the thought that brown-patch is at last in the way of being conquered, there is nevertheless a much deeper significance attached to this particular piece of research than is readily apparent to the casual observer. I refer to the value of lime in the turf-maintenance scheme aside from its value in controlling disease, and in order to bring out this point clearly it will be necessary to review the history of greenkeeping during the last 20 years.

That period in the history of American greenkeeping prior to 1920 has been facetiously referred to by the cynically inclined as the "bone meal" or "lime" era. During this period much lime was used on golf courses and in fact the seasoned greenkeeper applied it to the turf as a matter of course just as he applied



Photo courtesy Caswell Co.

manure, fertilizers, etc. With the advent of the Green Section and the subsequent era of intensive turf research at Washington, the use of lime was discouraged by the technical fraternity for good and sufficient reasons. In the first place it was found that the application of lime encouraged the growth of clover in fine turf and since most golf courses were highly desirous of ridding their greens of this growth they ceased the application of lime. Further research showed that lime encouraged the growth of certain weeds which was again a good and sufficient reason for discontinuing its use. Then, as time went on, it was found that the lime already present in the turf could be gradually eliminated from the soil by the use of ammonium sulfate, that this material was a very good fertilizer for turf, and that the bent grasses grew very well in soil rendered acid by the use of the sulfate. Thus came into being the "acid soil" or "ammonium sulfate" era of American greenkeeping, during which period the application of lime to American golf courses became a lost art.

### Acid Soil Troubles.

While we will readily admit that much good turf was grown during this acid soil era we will also willingly and gladly admit that this system of soil management had some very serious drawbacks aside from the prevalence of brown-patch. We will be perfectly delighted to see the acid era pass into oblivion and stay obliterated. Why? Well, if there is anything meaner, nastier and more ornery to handle than the general run of acid soils we have yet to meet up with it.

Consider a typical tight clay soil such as many golf courses are cursed with. These soils are invariably acid in nature, slow to drain, bake like a brick during droughts and are a pestilential mess as far as the growing of fine turf is concerned. Now if a well-informed farmer were undertaking to grow crops on such a soil he would begin operations by applying several tons of lime per acre. Why? Because the lime, in the course of a reasonable period of time would correct the soil acidity and thereby automatically "open up" the soil making it friable, quicker draining, and much less inclined to bake when dried out. In other words the application of lime to tight soils is a recognized procedure in modern farming.

However, during the "acid soil" regime

we were denied the use of lime on such tight soils where the bents and other fine turf grasses were to be grown because, as stated above, it was held that such grasses were best grown in acid soil. Consequently, the greenkeeper was put to the necessity of using other devious and relatively expensive methods of "opening up" tight clay soils. As far as the greens were concerned he changed the nature of these clay soils by actually transforming them into medium and light clay loams by the application of huge quantities of sand and liberal applications of organic matter. When this result was obtained the soil was still acid in nature but could be more readily handled because it was not as heavy and tight as the original clay.

### The Close of the Acid Soil Era.

This system worked out fairly well from the expense standpoint as far as the comparatively small area of the greens was concerned, but it would have taken a small fortune to so treat the fairways, and the sand-banks of the country would have been, sadly depleted before the operation was even partially completed. As a result the fairways of many golf clubs in this country during the acid soil era have not been much to talk about. Golf club officials simply shut their eyes to fairway conditions as they actually were and hoped for better days.

From present indications the "acid soil" era in the history of American turf maintenance came definitely to an abrupt end at 3:30 p. m. Friday, January 4, 1929, when Monteith read his paper at the Green Section meeting in New York, dealing with the effect of lime upon brown-patch, and if the ether waves are not lying I think I can hear the amused chuckles of more than one veteran greenkeeper who used lime in the good old "bone meal" era and quit using it only when threatened with the loss of his job for insubordination.

### The Bone-Meal Era Returns.

Why am I so firm in the belief that lime is coming back? It's a fair question and here's the answer.—In any phase of agriculture and of course turf maintenance is a phase of agriculture, what are the factors which determine the trend in methods? Is it simplicity of operation, the cheapness of a particular method or the fact that a crop will grow better under certain conditions and methods? Not by a jugful. It is the enemies of a crop

in the shape of insects and disease and the methods used in their control which absolutely decides the *modus operandi* to be employed in growing that crop.

Let us say for the purpose of argument that bent grass *will* grow better in acid soil than in limed soil. That doesn't mean that from now on, in view of Monteith's results in controlling brown-patch with lime, that bent grass is going to continue to be grown in acid soil. What is the use of growing the *highest* grade of bent grass in acid soil only to have it wiped out every summer by disease? It simply means that possibly a *slightly* lower grade of bent grass will be grown in limed soil but the slightly lower grade of bent will be more than compensated for by the freedom from disease. In the same way many clubs may dislike intensely the idea of using arsenate of lead for grub control but you've *got* to use it if grubs are present or else stand by and see the turf die by inches.

If the fine turf grasses do not grow quite so lustily in limed soil, (mind I'm not saying they won't) I still believe that the use of lime will be warranted and profitable if only because it renders the taming of stubborn soil types cheap and easy. A ton of ground limestone applied to an acre of stubborn clay soil will do more in rendering it amenable to the growth of fine turf than a carload of sand and at a fraction of the price.

### Weed Control in Limed Soil.

There is plenty of evidence to show that clover and certain weeds are encouraged by the presence of lime in the soil. Consequently we may expect to see a return to importance in the public eye of the problems of clover and weed control in fine turf when the use of lime becomes extensive. The answer of course is fairly obvious. It simply means that extended and intensive research must of necessity be conducted by technical investigators for the purpose of working out simple methods of controlling clover and certain weeds, these methods to be compatible with the use of lime. If such research is conducted in a thorough and consistent fashion by able investigators backed by

sufficient funds it is safe to say that control methods will be evolved in due course.

### Lime and Fertility.

Now is a very opportune time for every alert greenkeeper to pick up his copy of "The A. B. C. of Turf Culture" written by O. J. Noer and wear out some brain tissue by making a careful study of Chapter Four entitled, "The Functions of Organic Matter in the Soil." In this chapter Noer details the role that the organic matter in the soil plays in feeding the plant growth. He shows that a soil must be in the pink of condition as far as drainage, physical condition of the soil particles, aeration of the upper soil layer, etc., are concerned in order that the organic matter may decompose at the proper rate and thereby release its store of plant food in such a shape that the growing plant can absorb it. This is necessary because the bacteria responsible for the decay of this organic matter work best when they have adequate soil moisture and free aeration of the soil to supply needed oxygen. Noer also indicates the value of lime in assisting the bacteria in their important work of converting raw organic matter into plant food.

Under the circumstances, other things being equal, it follows that a soil containing sufficient lime will always be more fertile and support a heavy growth of turf much more efficiently than will a similar soil deficient in lime. In other words the lime assists, first, in putting the soil into good physical condition; this good physical condition being indicated by the fact that the soil is easily handled. It drains much more readily and quickly after a heavy rain. It is more springy and friable to the touch and can be dug, cultivated or otherwise handled without forming into hard clods. When such a soil dries out it has less of a tendency to bake. Secondly, since lime does all these things to a stubborn soil it increases the fertility of the soil because the soil bacteria are then able to work on the organic matter in such a soil to the best advantage and thereby convert this raw material into available plant food.

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## Significance of Recent Turf Research

By B. R. LEACH

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It follows therefore that an acid soil, that is, a soil deficient in lime, must of necessity be handicapped as regards its capacity to convert organic matter into plant food for the plain and simple reason that soil conditions are not at their best for maximum bacterial action. Such acid soil when used for the growing of the turf grasses must of necessity be "babied." It must be fed frequently with quick acting fertilizers in order to keep the grass "on its toes."

If the use of lime becomes common on fine turf there is every probability that less of the "babying" of fine turf will be necessary. When these acid soil greens with their present baby digestions get a shot of lime they'll develop the copper-lined digestive apparatus of a boa constrictor and howl for red meat.

### Lime But Not Too Much Lime.

In conclusion, a word of caution; this word of caution being directed especially

to that type of human who swallows two tablespoonfuls of Epsom salts when a teaspoonful would serve the same useful purpose. Don't become too enthusiastic and apply lime with a shovel. When you apply 50 pounds of lime to a thousand square feet of turf you are applying it at the rate of one ton per acre. This is the rate that Monteith used in controlling brown-patch at Washington. At the present time the Doctor does not have any too much information as regards the dosage of lime to be applied but such information will no doubt be rendered available in due course.

I personally prefer ground limestone or other form of commercially pure calcium carbonate for application to fine turf. This material will correct soil acidity and does not possess the caustic properties of hydrated lime. Being very slightly soluble, only very finely ground material should be used.

It should all pass 100 mesh sieves and the 200 mesh is even better. Unless the limestone is finely ground uniform distribution is difficult, and only the soil immediately surrounding the lime particles is benefited.

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