

to give impossible percentages of growth and purity—knowing that the buyer cannot check him, and he often substitutes a cheap variety for a more expensive one—again knowing that he cannot be checked, as it is impossible to identify some seeds even by microscopic examination—and by the time the grass is grown and can be identified, it is too late.

## Sour Soils, Their Causes and Treatment

By PETER LEES

THIS is a subject that applies more to inland courses than those situated by the sea, as the soil is of a heavier nature and consequently apt to get into a sour condition. There are several reasons for soil becoming sour and the following are some of the principal ones:

The first and most important is want of proper drainage. It is absolutely essential, if the soil is to be kept in a sweet condition suitable for the maintenance of a good healthy turf, to have proper drainage. In making a new course this is a very important point that should be carefully gone into and a systematic scheme of drainage carried out.

Grass will not thrive on wet sour soil no matter how much money and labor may be expended on fertilizers, etc. It will gradually and surely go back and weeds of all kinds will soon take its place and in a short time the greens will not be fit to play upon. The second cause of sourness in soils is one that is brought about by injudicious watering.

It is most important to have a liberal supply of water at hand, but this does not imply that it should be used indiscriminately even if there should be a good system of drainage, as time and again even on sandy soils where drainage was perfect I have seen the surface turned into a wet, sour condition simply because the watering had been overdone. As it does not rain every day then why should it be necessary to water every

day; it is not natural. It is this *sprinkling* that does the harm and creates a sour surface. Soak the green well, say twice a week if it should require water, as by thoroughly soaking it the water will get down to where it is wanted, at the roots, and the surface will be kept open.

Another reason for soil becoming sour is too much rolling. Especially when the surface is wet a great deal of harm can be done by rolling. Grass, like a human being, must have air, so if the surface is rolled into a condition resembling cement, sourness will soon appear and the grass, especially the finer varieties, will soon die out.

There is another reason for ground becoming sour. It has been said that worms are the natural drainers of the soil and if exterminated the turf will assuredly suffer. I have proved this to be absolutely wrong and have arrived at this bold assertion from years of experience. Take a putting green or fairway that has been used for a few years and observe how the worms have multiplied as compared with the sides that have had no attention bestowed on them. They have thrown up their casts all over and to make play at all possible sweeping and rolling has to be resorted to. This continual sweeping and rolling must undoubtedly change the character of the surface and sourness will set in if continued. My advice in this case is get rid of the worms and kill them entirely if a good healthy grass is desired. This cannot be obtained if they are allowed to burrow and throw up their casts all over the surface.

In conclusion I may say that if grass is to thrive the ground must be kept sweet and yet so that the air can reach the roots; this can only be done by drainage below and proper treatment above. Roll with light wooden roller if rolling is necessary, use plenty of *lime*, feed the grass well to keep it strong and healthy and water discreetly. If these points are carefully seen to, no trouble need be feared from sourness in the soil and a fine carpet of turf should be maintained at all times.