

The change in the source of power for turf equipment was one of the great accomplishments in this field. Prior to the time of power equipment, good turf management was restricted to a very small area. With the advent of power driven cultivation equipment, which came around 1946, the cultivation of turf became a standard management practice. Other developments which have advanced the field of turf have been planters for vegetative materials and machines for seeding steep slopes, improved mowers, seeders, sprayers and fertilizer distributors.

A 3-Phase Contract to Protect the Club

By **GEORGE W. COBB**

Golf Course Architect, Greenville, S. C.

I am afraid that many architects feel that the design of a course is the only thing that concerns them. Consequently, there are many cases in which the entire construction phase is tossed in the lap of an assistant, a construction supt., contractor or even an individual club member or a group of members.

We break our course building contracts into three phases. The first is the preliminary layout of holes; the second is setting



up of specifications for building; the third is personal inspections while the course is being built.

I think that the second and third phases are so important that it is clearly stated in the contract that the client is not obliged to proceed with either until he is satisfied with what has been done before. He has immediate call upon my services to straighten out any detail which is not to his liking. I know of quite a number of courses where a designer's name has been attached to the layout although he has done nothing more than route the holes.

Architecture, to my way of thinking, is not as simple as that.

It can't be divorced from construction. The overseeing of the building of tees, greens, fairways, and particularly the installation of the course drainage system are far more important functions of the architect than the mere drawing of the design. If he doesn't take the trouble to frequently visit the building site and see that everything is going according to his plans, he has no right whatever after the damage is done to utter those famous last words: "They didn't build it according to my layout or directions."

Nutrition—A Disease Control Factor

By **ELIOT C. ROBERTS**

Associate Professor of Agronomy,
Iowa State University

Fungus produces disease symptoms in grass plants by feeding on contents of the cell. When a fungus pathogen (organism) infects turf it does so in two stages—through entry into the interior or tissue, and by establishing itself so that it can feed on substances produced by the plant. Resistance to the disease may occur at either or both stages.

Structural characteristics of the leaf or root surface may favor or repress invasion of the fungus. Waxy coating of the leaf for example, may make it more difficult for a fungus spore to work its way in. Presence of hair on the leaf surface has been known to have a similar effect. The number, size and positioning of stomata (a tiny breathing pore) on the surface of the leaf may also favor or discourage penetration. Another factor is structure of the cell walls on the leaf surface.

Fungus may enter a plant as the result of various mechanical, chemical or insect injuries. Root damage, such as from nematode infestation, invites invasion.

Inner Workings

Production of certain organic acids, sugar, tannin, etc. within cells protects the grass plant against fungus. These materials counteract enzymes produced by the organisms. It is believed that high carbohydrate content in relation to nitrogen and presence of compounds such as magnesium sulphate and potassium phosphate within the cell modify the effect of enzymes generated by fungus. If these en-