

Science Must Supply Base for Turf Campaign

By WENDELL P. MILLER

THE mining engineer admits that he cannot see into the ground—and that conclusions not predicated on all pertinent facts are dangerous, so he drills holes, drives shafts and tunnels, surveys, samples, and assays. The Anaconda and Chile copper and all the lesser mines of the world are run on the basis of exact knowledge obtained in advance of decisions. The rule-of-thumb, trial-and-error, and guessing miners have been forced out of business.

Lately, those engaged in turf operations are coming to admit they, too, cannot see into the ground and safely draw conclusions from what they see on top of the ground or depend on trial-and-error, rule-of-thumb, or personal dicta based on one's own limited experience. Today the use of exact knowledge based on drillings, soil survey, sample, assay and plant survey, is the basis for turf control at many courses which are invariably in fine condition.

The necessity for this exact knowledge is obvious, for who of us are so endowed that we can see into the soil, determine the plant foods and their rate of availability, tell by looking whether the chemical condition and physical structure of soil is exactly suited to the grasses we wish to cultivate, know what applications, if any, to apply to release the locked-up potential plant foods, and determine what plant foods are needed to supplement those in the soil?

Who is so endowed that, by looking, he can determine dissimilar fundamental soil conditions when soil appearance and plant growth are similar to others he is familiar with? Who has the time and money to experiment with trial-and-error methods? Who is willing to continue taking chances until some one guesses right by rule-of-thumb?

Chance can be eliminated, guessing abolished, rules-of-thumb discarded, and all operations based on certainty of knowledge, thru the same exactness of procedure and painstaking investigation methods used in other fields of effort where certainty of outcome is essential.

Painstaking investigation through the soil and turf survey, analysis, and report, is the fundamental basis—the only definitely certain basis—for turf maintenance and development. Without the soil survey and analytical report the most experienced turf handler in the world is merely guessing.

Absolute Findings the Basis.

It is easily possible for the green-chairman and greenkeeper to predicate all of their operations upon the absolute findings developed by soil technologists. It is only thru the use of such exact knowledge that waste of effort and money can be eliminated and all operations reduced to economical certainties.

The wise green-chairman depends upon exact knowledge. The experienced greenkeeper insures his reputation thru the use of this exact knowledge, and desires that his green-chairman obtain the complete soil survey and analytical report.

Backed by the facts contained in the survey report the greenkeeper is in position to secure adequate consideration of his requests to his chairman, and the chairman, in turn, has sound backing when he places his budget before the finance committee.

The soil survey, thru field and laboratory examination, should determine the physical characteristics of the soils; and outline the mechanical methods which are suitable, and those that are not suitable, for use in conditioning and handling the soil.

Guides Watering Practice.

The report should cover the irrigation situation and the climatic conditions, indicating any deficiencies, by months, in the available rainfall, or in the quantities of water artificially available. It also should indicate the absorptive capacity of the soil, and the required rate of application for artificial watering.

The condition and efficiency of the drainage requires careful consideration. The report should specifically set forth the areas which are poorly drained, and those where drainage is wholly lacking. The re-

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port must indicate clearly the areas in which turf development cannot proceed satisfactorily until proper drainage is supplied, either by new work, extensions of existing drainage, or reconstruction. If maps of the drainage system are available to the examining engineer, the report ought to indicate any areas where the drainage system, though apparently adequate, is not functioning.

The soil survey and report should cover the equipment situation of the owner, guiding investment in equipment, and making positive recommendations for basic equipment requirements.

A Soil Conditioning Guide.

The soil survey and report must indicate areas which need soil conditioning, with specific recommendations as to time and methods; what plant foods are present in the soil but not available because of the lack of bacterial action needed to break down the locked-up potential foods; what foods are present, and available; the rate of availability, and what foods are lacking; and the extent in each case; also, specifically what fertilizing elements are required, to what extent, at what rate of availability, and what commercial products will most economically and satisfactorily make good the deficiencies. The report should give specific data as to fertilizers, and their time and rate of application.

Plant surveys, as part of a general survey, indicate the presence of noxious weeds and dangerous plants, and methods for their elimination. The report should show what grasses, if any, will grow to better advantage and give better results than those in use, with information as to seeding requirements; describe the types of grasses found on the putting greens, their

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suitability and wearing qualities, the acidity or alkalinity of each green, the acid tolerance of the grasses on the greens, if acid soil types; methods of overcoming acidity or alkalinity; specific information as to top-dressings, composition of top-dressing; composting, and materials available for these purposes.

The investigation also should deal with any pests or untoward growths on the grounds, explain their habits, and means of eradication. It must be the object of the survey to determine all the favorable and unfavorable conditions of plant life and growth on the property examined so that the owners can extend the favorable conditions and take every advantage of them, and at the same time eliminate, or initiate action tending to eliminate, all of the unfavorable conditions.

Basis for Program.

When the chairman and greenkeeper are provided with specific, correct, and dependable information on the soil and turf they are enabled to carry on their work in the light of exact knowledge, and according to technically and practically correct procedures, thus eliminating wasted efforts, time and money spent unnecessarily; besides, and most important of all, preventing mistakes and errors in the handling of turf.

Consistent year by year improvement in turf can only be attained by conscientiously following a definite program. A large number of clubs, notably the Columbus C. C. and Scioto in Columbus, Ohio; Westwood in St. Louis, Onwentsia, Glenview and Sunset Ridge in Chicago, have been making marked progress in turf development through the application of the facts developed by a complete soil survey. Turf development at its best is a slow process, but when nature is aided, year after year, by a program developed upon facts, you can get lasting results at an economical cost.

THE turf on the tee should be composed of a hard deep-rooted grass that will stand cutting of ordinary divots and recover. Therefore a foundation should be made which will encourage the roots to go down, whereas if a tee is only top dressed the roots quickly come to the surface and each divot made is disastrous.

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