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Soils I Have Seen*

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GOLFERS are prone to be unreasonable and demand perfect putting turf irrespective of weather conditions. They invariably demand May turf during the adverse months of July and August. This is especially true when clubs possess elaborate establishments which necessitate high annual dues. Members pay to play golf and expect well groomed turf at all times.

During 1928 turf on many courses suffered disaster. Courses located in the belt extending from Washington across to Kansas City were badly hit, but even to the north the season tried the souls of experienced and capable greenkeepers. Old timers with thirty years' experience unhesitatingly say they have seen nothing like it in all their years of service.

It is said that new-fangled methods are the underlying curse and that a return to the so-called old time methods will work magic and dispel all turf ills. This is the easy method and in a measure true. But will these methods maintain standards of turf excellency demanded by present day golfers? Rivalry between clubs, and desire for perfect playing condition may prevent this. The present need is for a thorough overhauling and correct evolution of the basic factors underlying the development and maintenance of sturdy turf. This is really

constructive. It will require time, painstaking investigation and must be adequately financed. In the meantime a review of the disasters of the past season may be helpful in avoiding, or at least lessening, future troubles.

Proper Diagnosis is Necessary

IN CONSIDERING turf ills, needless to say, corrective measures must be based on a proper diagnosis of the trouble. This is not always easy because of the multiplicity of factors involved in the growth of turf. Fertilizers will not effect permanent turf improvement if major injury is due to impervious water-saturated soil.

Lime in sand should not be blamed as the sole cause of weed infestation if the soil used in top dressing mixtures teems with viable weed seeds. Repeated applications of fertilizer to diseased turf serve only to aggravate the situation if previous over fertilization made the turf more suscep-

tible to the ravages of the casual organism.

If varieties of grass adapted to local climatic conditions are used, then soil condition is extremely important. After all, a green is more than a place to grow grass. It must be able to hold the ball, and withstand heavy traffic during adverse summer weather. The importance of proper physical soil condition was brought out forcibly during the past season.



O. J. NOER

*Digest of talk delivered at the Buffalo meeting of the National Association of Greenkeepers

Soil Condition Most Important

SOIL is not simply so much dirt. It supplies the expanding turf with water, plant food and the entrapped soil air furnishes oxygen so vital to the life processes of the roots. Humus is the distinguishing characteristic of soil, and it is mainly the presence of humus which distinguishes the surface soil from the underlying subsoil. The existence and development of soil micro-organisms depends upon the presence of humus to satisfy their food and energy requirements.

Fertile soils teem with these minute bacteria, ceaselessly working and constantly liberating available plant food. The most important characteristic of soil from the standpoint of greens is texture and structure. Texture refers to size of individual soil particles, and structure their arrangement. If the dominant particles are minute, free movement of water and air is impossible. Air is excluded, and desirable bacterial activity depressed, in water saturated soil. The troubles of 1928 demonstrated the importance of correct physical soil condition because of the abundant rainfall.

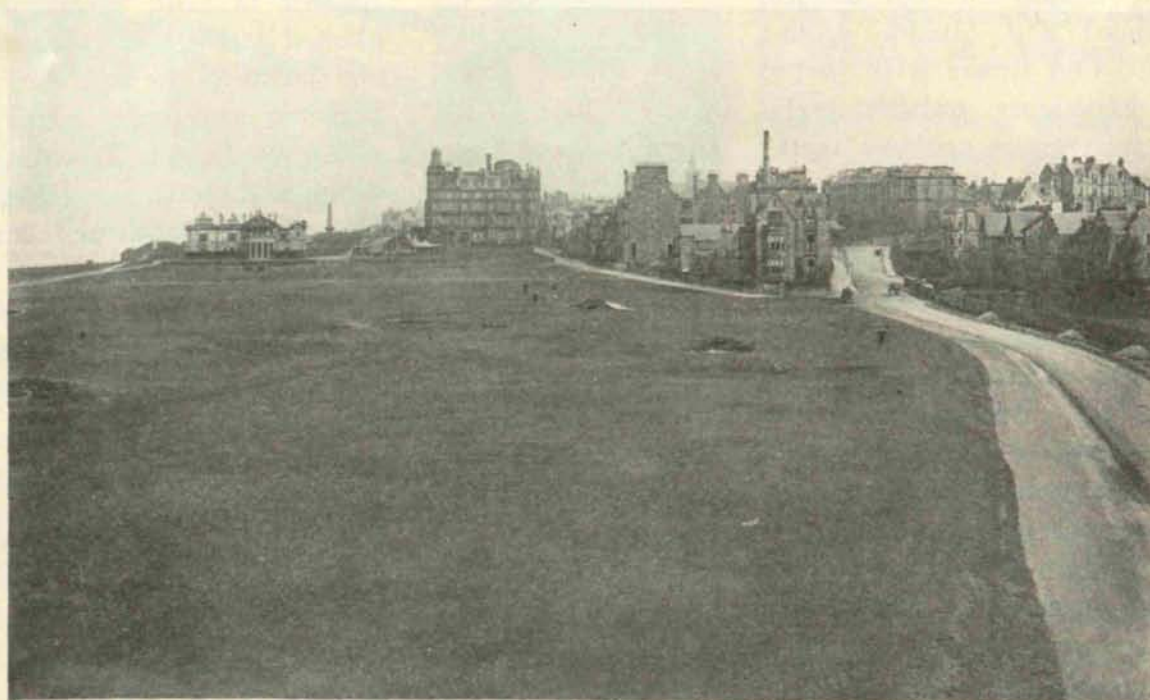
Sandy loam soil approaches the ideal, and a light soil is certainly preferable to a heavy clay. Sandy soils are usually condemned for their low plant food content and low water holding

capacity. Both of these drawbacks can be provided for on putting greens. The open structure of such soils permits deep penetration of air and rapid removal of excess water.

Aside from any effect soil reaction may have on the growth of turf grasses, we know that extreme acidity favors the growth of fungi and retards the activity of some groups of desirable bacteria. Furthermore acid soils are usually more compact and tend to revert to a puddled condition. This is not a plea or brief for the indiscriminate use of lime because it is a fact that some courses with alkaline soil fared badly.

That soils must be adequately supplied with plant food elements cannot be challenged. Roots absorb soluble materials only, but soils never contain sufficient soluble plant food to adequately provide for an entire season's growth of turf, so it is necessary to make conditions suitable for constant release from insoluble reserves, or to add available plant food. When physical soil condition is correct, water and fertilization are probably the key to the solution of the troubles of 1928.

MAINTAINING the soil slightly on the dry side is better and will tend to check growth somewhat. The system of nitrogen feeding may need some overhauling. In the



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past, color and amount of growth have been used as the major criterion in determining need for nitrogen. Possibly sturdiness is really more important and probably this can be achieved by the rational use of nitrogen. Lighter applications seem in order. It is always possible to make additional applications but excess fertilizer once applied cannot be removed. It is folly to expect applications of phosphorus and potash to wholly overcome the detrimental effects of over-nitrogen feeding. Rational feeding is often all the correct solution.

Excess Water is Dangerous

EXCESS water not only conduces to rapid growth accompanied by weak tissues, but also affects bacterial activity in the soil. There are two types of bacteria, those which depend upon the presence of oxygen for their existence and those capable of existing and working in the absence of oxygen. The first type are the beneficial soil organisms.

In water-logged soils where oxygen is excluded these undesirable bacteria flourish and are responsible for unwonted and sometimes damaging fermentation. So long as the soil is well supplied with oxygen these organisms need not be feared for they fail to function. The significance of this fact is not generally appreciated.

From the standpoint of fertilization, nitrogen feeding is the all important consideration. The startling results produced by nitrogen fertilizers are evidenced by dark green color and rapid growth; which in excess is always associated with weak tissues. In some instances the startling improvement usually effected by quick acting nitrogen fertilizers prompted their use in vain attempts to revive sick turf. Unless conditions are right and the turf shows signs of recuperation such procedure may prove detrimental.

If over-feeding induced weak susceptible tissues, continued feeding only aggravates the condition and the result may be a continued round of trouble. Here again this must not be construed as condemnation of all fertilization, but rather as a plea for rational fertiliza-

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tion. During stress it takes courage to withhold or delay nitrogen feeding but there are times during the hot months when it should be done.

Hope for the Future

PREDICTIONS are dangerous and often damaging to reputations, but one or two points seem reasonably clear. The season of 1928 simply emphasized the well-known fact that the combination of abundant nitrogen, excess water, and relatively high temperatures produce rapid growth associated with weak tissues. If some of the troubles are to be avoided, practices which will produce and maintain sturdy turf during the hot adverse summer months must be accentuated.

Adequate drainage of heavy soils and the use of topdressing materials of suitable physical condition are fundamental. Extreme care in watering seems important to avoid excesses, and during the hot months may mean hand watering on greens blessed with low-lying pockets or surface runways. When sprinklers are used these areas frequently become saturated due to surface movement from the surrounding higher areas.