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## Last Year Showed Need for METHOD REVISION

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THOSE charged with turf maintenance look back upon the past season as the most disastrous in years. In fact, many old timers can recall nothing like it in their entire experience. That there are many problems relating to turf maintenance awaiting solution cannot be denied and if 1928 does nothing more than stimulate a critical overhauling and study of the basic factors underlying turf culture the past troubles may yet prove a blessing in disguise. Of necessity immediate solutions cannot be expected, yet an analysis of the unusual conditions existing during the past season may at least suggest corrective measures to lessen the possibilities of future injury, although so long as golfers persist in their demands for exceptional turf during the hot summer months the danger will persist.

### Too Much Moisture

In general, courses in the belt extending from Philadelphia and Washington across to St. Louis suffered most, but even to the north troubles exceeded anything previously experienced. Both small and large brown patch were severe and extremely difficult to control. Not content with these, attacks of pythium and leaf spot appeared and were especially troublesome because effective control treatments are not available. Turf on large areas, and in rare instances on entire greens, was wiped out completely. In some cases injury appeared to be the result of excessive moisture pos-

sibly aggravated by unfavorable soil processes which accompany water-logged condition; yet in other instances loss of turf must have resulted from other causes not clearly apparent or at present explainable. On the whole, weak, tender lush grass was far more common on greens than sturdy erect turf. There can be no question that such turf is very susceptible to disease and other forms of injury. The hope for the future must be in counteracting the factors which tend to encourage weak growth.

Unusual weather conditions were responsible for most of the ills, yet soil texture and overfeeding frequently were contributing factors. The Weather Bureau reported about 7½ inches rainfall during July in New York, which exceeds the normal precipitation by more than 3 inches. The mean temperature was also considerably above the average. Heavy downpours of rain were followed by hot, humid days. Similar conditions existed in other districts. Injury was not confined to turf. Many of the famous Japanese cherry trees along the Potomac in Washington succumbed. Investigators from the Department of Agriculture attributed death to the numerous torrential rains. The root systems were not able to withstand the exceedingly moist soil conditions resulting from excessive rainfall.

### Showed Need of Aeration

Water injury was aggravated by poor physical condition of the soil. Greens

which supported good turf in the past became troublesome. They remained saturated with water for days because the compact subsurface soil impeded or prevented the downward movement of excess water. This excluded air and thereby deprived the roots of essential oxygen. In the absence of oxygen undesirable putrefactive fermentation occurred in the soil, recognizable by the associated foul odors. This type of bacterial activity occurs only when oxygen is excluded and hence can be avoided by maintaining well aerated soil. The latter is also an essential condition for turf development.

Fertilizer programs, effective in normal seasons of more limited rainfall and lower temperatures, became excessive, and coupled with abundant moisture, encouraged unduly rapid growth. That nitrogenous fertilizers produce startling improvement of poor stands of grass, is familiar to everybody charged with turf maintenance. Nitrogen induces dark green color and rapid growth. Tender and weak stems usually accompany too much forcing. The wise market gardener, intent upon producing crisp palatable vegetables, forces rapid growth in insure succulent vegetable tissue and uses nitrate of soda or sulphate of ammonia generously. The effects of too much nitrogen can never be wholly overcome by applications of phosphate and potash.

### Practice Needs Revision

Strange as it may seem to some, highly maintained courses fared worse than those with limited funds for maintenance. This should not be cited as a reason for discontinuing the use of fertilizers. It might serve equally well as a plea for neglect and severely curtailed maintenance expenditures. Abrupt cessation of fertilization will eventually result in impoverished soil accompanied by thin, weed infested turf requiring rejuvenation. The constructive solution is rather one of overhauling and modifying present practices in the light of past experiences.

Prophesying is dangerous, yet definite changes appear inevitable. Since weather cannot be modified it seems reasonable that relief must come from practices which will

produce sturdy grass, particularly before the advent of hot weather, and then hold this condition during the extremely difficult months of July and August. From what has been said it follows that ample moisture, plentiful supply of plant food, especially nitrogen, and favorable temperatures conspire to promote rapid growth which is a forerunner of weak tender grass. The first step must be correction, or improvement, of faulty drainage. Not only surface run-off, but also downward movement of water, must receive attention. Soil texture is not easily modified on established greens, but installation of tile where the soil is heavy usually hastens the removal of surplus water absorbed by the soil. The possibility of detrimental seepage must be considered where greens are located at the base of hills or slopes. Tile lines placed outside the green, between it and the offending slope, will cut the line of flow. More careful watering, especially during the summer may prove helpful. Keeping the greens a little on the dry side, tends to inhibit growth and encourages stiffer leaves and stems. Need for plant food has been judged usually by color and amount of growth. Probably sturdiness and hardiness is of even greater importance in determining both rate and frequency of applications. During the mid-summer only sufficient nitrogen to satisfy the minimum demands of the turf should be used; greater amounts may aggravate and accentuate brown patch and other troubles. When trouble develops, additional fertilizer should be used only when the evidence indicates that the turf requires and is able to utilize the additional plant food. Judicious nitrogen feeding undoubtedly depends upon a uniform and continuous supply in amounts simply sufficient to satisfy the turf demands. This may mean lighter applications, possibly at more frequent intervals when quick acting soluble fertilizers are used. In spring and fall when turf naturally grows well, rates will of necessity be greater than in mid-summer.

The hope of the future rests upon developing practices which will produce turf sufficiently robust to withstand disease.

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