

phoric acid of applied phosphate fertilizers. Then the phosphoric acid is precipitated as relatively insoluble aluminum and iron phosphate rather than as the more available calcium and magnesium phosphates.

Strong acidity increases the solubility of the so-called basic elements such as manganese, copper, lead etc. Copper poisoning was prevalent during the acid era when bordeaux was tried for disease control due to the solvent action of the acids resulting from the excessive use of ammonium sulfate. Copper toxicity can be reduced by applying lime to precipitate the soluble copper as an insoluble compound.

Results of Excess Lime

The excessive use of lime, particularly in the form of hydrate, occasionally depresses growth of grass and other plants. It is because the lime makes all the trace elements such as iron, manganese, copper etc. insoluble and hence unavailable. Even phosphoric acid is less mobile in the presence of excessive amounts of lime.

But the other extreme of excessive acidity may cause a lack of calcium, and sometimes of magnesium in amounts adequate for growth and is believed to be the reason for the failure of plants to behave normally in acid soil. To support this contention there are instances when plants tolerate more acidity provided there is sufficient calcium in the soil. But a condition is reached eventually when the acidity becomes too strong for the plant.

The fad for dosing turf with ammonium sulfate to produce an acid soil for the control of clover and weeds was short lived. It lasted less than a decade. Emphasis now is placed upon practices which produce and maintain a dense heavy turf. The value of lime, even for the acid tolerant bents is recognized and the necessity for using it is stressed not only because of the direct effect upon the plant, but because of other essential benefits upon the physical, chemical and biological properties of the soil.

The concluding article of this series will discuss the practical aspects of lime and its application to turf.

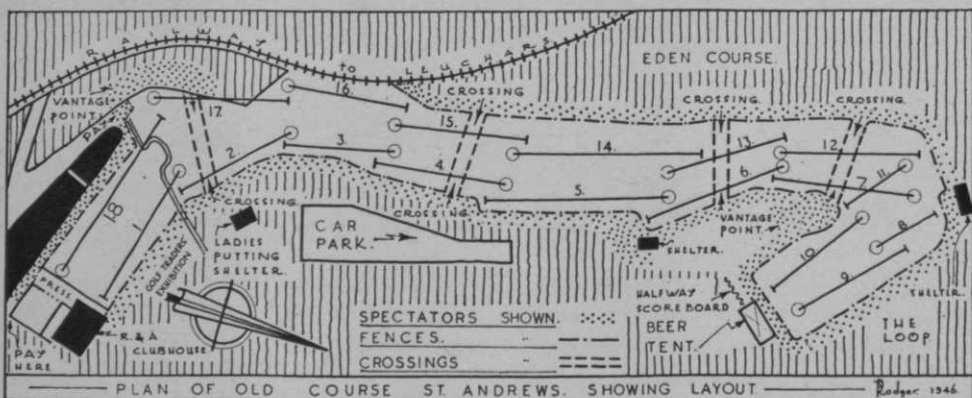


Diagram from Golf Monthly, Edinburgh, shows how St. Andrews arranged to keep spectators on side lines during Spalding tournament in June and British Open in June. German PWs, working under Andrew Corstorphine, head gkpr, cut spectator path through whins which separate Old Course from the New. Pathways are laid out to provide maximum view of play, with hillocks forming natural grandstands. Spectators follow a one-way traffic system, kept off fairways by stake and rope fence. Marshals allow spectators to cross course behind players, at points shown on map. Admission fee for the British Open was approximately 96 cents.

Greens and tees were judiciously roped off at U. S. Open at Canterbury by Golf Supervisor Jack Way and Gkpr. Mal McLaren and marshaling was done probably better than at any other U. S. major championship. Nevertheless, crowd surging in too close to a drive caused Nelson's caddie to kick ball after elbowing through the pack and brought the penalty that beat Byron out of the title.

Bleachers at eighteenth and ninth greens have not provided satisfactory answer for spectator problem at U. S. tournaments. The St. Andrews idea may inspire further effective study of crowd control.