A SHORT SHORT-COURSE IN GREENKEEPING

HIGH rating placed by attending greenkeepers on the papers presented at the annual Lawn Day of Massachusetts State college suggested that GOLFDOM present available outlines of these papers as prepared by the authorities who read them.

In the following notes of the authors, greenkeepers will find considerable material for study and discussion.

SOIL WATER AND THE GRASS PLANT

By HOWARD B. SPRAGUE

The supply of soil water is indispensible to growing grass. Living green plants are 70 to 95% water, and this content must be maintained. Water is used to manufacture new cells and tissues in roots, stems and leaves, and all of the soil nutrients enter the plant dissolved in water. In addition, it has been estimated that 20 to 40 gal. of water are given off by the leaves of grass on each 1,000 sq. ft. of lawn surface during a single hot day. The most important point to note is that every drop of this water must be absorbed by the plants' roots from the soil.

The principal supply of water is rainfall. This is supplemented by artificial watering in dry periods. The effectiveness of rainfall is determined by the rapidity with which it falls, the ability of the soil to absorb it, and the evaporating power of the air. Gentle rains are more effective than sudden downpours, and gentle slopes permit greater penetration than steep slopes. The drying power of the air normally increases from April until it reaches a peak in July, and thereafter it falls steadily with the season. May, June, July and August are all months when evaporation normally is high in comparison to rainfall, in contrast with September and October which permit the restoration of soil moisture exhausted in summer.

Only a portion of the soil moisture is available for use by plants. The thin films of water held tightly by the soil particles are not used by grass roots. Thus, plants wilt when there is still moisture in the soil because it is held so strongly that the grass roots cannot absorb it. Only the water in the capillary spaces between the soil granules is useful to plants. After a heavy rain, or watering, some free water is present in soils, but this quickly drains away in good soils. The maximum water holding capacity of soils is the amount of total water which the soil contains after the superfluous water has drained off. To illustrate, a certain sandy soil may have a water capacity of 17 lbs. per 100 lbs. of soil. Since 4.5 lbs. will be unavailable to plants in this soil, the potential supply for use by plants is 12.5 lbs.

The water holding capacity of soils varies tremendously with texture, structure, and organic matter content. A rich silt loam may easily hold twice as much available water as a light sandy loam. In general, heavier soils are capable of storing more water than light soils. Also, soils which are in good structure or tilth will store much more water than soils of the same texture which are badly puddled or compacted and have but little pore-space. Soils that are rich in organic matter are more likely to be in good tilth, and the organic matter itself has at least 10 times the water holding power of soil particles.

The depth of the root system determines the use which grass roots are able to make of the soil. Poorly drained soils force plants to develop shallow root systems. On well drained soils, the height of cut and system of fertilization influence the root development. The ability of grass to endure drought is determined by the water supplying power of the soil and the depth to which plants can use soil moisture.

AVAILABILITY AND LIFE OF FERTILIZERS

By L. S. DICKINSON

The availability rating of a fertilizer is a comparison with a standard whose nitrogen, phosphorus, or potash, as the case may be, is wholly useful to the plant use within a reasonable time after the fertilizer is applied. For example: In nitrate of soda all of the guaranteed nitrogen is immediately available for plant use when dissolved in water (soil water); cottonseed meal has an availability rating of 70 which means that only 70% of the