GOLF SCHOLARSHIP

The Maryland State Golf Association presented a $500 scholarship to Glenn S. Shields of Rockville, Maryland. Glenn's father, Bob Shields of Woodmont C.C. was present to see the award presented by Irving E. Cantor, vice president of the golf association. Glenn is a graduate of Richard Montgomery High School and attended Montgomery College. He will enter the University of Maryland this fall. Glenn was also presented a $250 scholarship by a former greens committee chairmen at Woodmont C.C.

THE IMPORTANCE OF WATER MANAGEMENT PART I

Fred V. Grau
Consulting Agronomist
College Park, Maryland

Water is LIFE! Death comes when there is a scarcity or an excess. Floods killed 500,000 Pakistanis in minutes; Pakistani parents repaired the population loss in just 40 days. Deserts speak eloquently of the loss of life when water ran out. Old prospectors managed water very carefully because it was Life! We recall the Rime of the Ancient Mariner - "Water, water everywhere - nor any drop to drink." We are using water at a prodigious rate. By 1980 we can expect water usage to equal replenishment by rainfall, snow melt, glacier melt, dew and all other forms of water return. Where do we go from here? Overpopulation is not likely to be blamed for loss of life but lack of water could be the real cause only because there are too many people who are using and wasting too much water.

In southeast Asia there is a village where the only source of drinking water is 9 miles away. Only women carry water and one wife can make one trip a day. This forces the man to take more wives who can then supply the family with sufficient water. Water runs downhill and finds its own level. A hose filled with water is a simple device for levelling and staking an area for zero grade. As water moves it erodes and carries impurities with it. It is very important to reduce erosion to a minium so that our sources of water may not be unduly contaminated.

Water is a universal solvent. It disolves rocks and minerals. It carries plant nutrients in solution. It may form 90% of the weight of green plants. Water is an essential constituent of every living cell.

Water freezes. When it freezes it expands. Pressures thus created burst many structures. Rocks are split asunder, one of the soil-forming factors.

Water evaporates and, in so doing, absorbs heat and cools the atmosphere. Evapotranspiration is the device by which green plants cool and create a more pleasant atmosphere.

Water boils and passes into the air as steam or water vapor, one of the many forms of water. Water is a chemical reagent entering into and becoming a part of infinite number of chemical reactions.

Pure water exists only in the laboratory. Good drinking water may be "pure" in the medical or pathological sense but the "goodness" of drinking water is created by dissolved minerals and impurities. "Pure water" is flat and uninteresting.

Water has tensile strength similar to some kinds of steel. It would take a pull (force) of 210,000 pounds to rupture a column of water one inch square.

Desalination (de-salting) of brackish water is gaining ground. Cost is now the big drawback. In Texas during a drought water sold for 50¢ a gallon. In New York not long ago you got water with your meal only if you requested it.

On Long Island there are some 7,000 Recharge Basins ½ to ¾ acre in size, 12 - 15 feet deep with porous bottoms that collect surface water from highways, roofs, shopping centers. The water soaks into the soil, recharging the ground water and keeping out the salt water from the Sound.

In life we have a closed cycle of water, oxygen and carbon dioxide with hydrogen atoms going back and forth where needed, all driven by sunlight, the ultimate source of power.

In South Africa they are "milking" the clouds to obtain water. Huge nylon nets are suspended on tops of mountains to condense the moisture in clouds that pass over but never drop any rain.

Microorganisms need water. There are times when soil pores become clogged with the bodies of living and dead microbes. This is true especially when water is present continuously in excess.

Soils become more friable when they enjoy cycles of wetting and drying. Soils that are continuously wet become "sour" and unproductive. Only the anaerobic organisms persist - the ones that create substances toxic to grass.

It is not possible to "partially wet" a soil. Irrigation consists of saturating the surface to a depth determined by duration and quantity. With drainage and percolation water moves downward pulling air into the soil pores. Roots of grass must have oxygen. With continued percolation and plant usage the "saturated" soil moves into the "field capacity" range where plants grow best. With no further water applied as rain or by irrigation all available water is used and we reach the "wilting point".Some plants die very soon after this - others can tolerate days and weeks at the wilting point and return to normal upon resumption of irrigation.

In preparing for this paper I re-read USDA Yearbook on "WATER"; Turf Management by Musser; Turfgrass Science, American Society of Agronomy Monograph No. 14; many bulletins and a delightful book, "On the Shred of a Cloud" by Rolf Edberg translated from the Swedish. I urge each one of you to re-read all you can on the subject of WATER. We don't have much time left.

A baby born today will polute 3 million gallons of water in his lifetime. Providing food, goods, and services for this baby will polute another 30 million gallons.

As a nation we are running out of water! We must learn to conserve it, to reuse it, to recylce it as never before.

Hawaii is blessed with an abundance of good water but turf is being ruined by the excessive and wasteful use of water. Now, with automated water systems, we anticipate an even greater misuse of water. We can only hope that those who manage these new systems will exercise restraint.

A new systems of "Drip Irrigation" now being practiced in California claims to use 60% less water with superior results. We can hope to adopt something like this to turf.

An example of water management can be cited on a course in the Mid-Atlantic area. Two years ago it was mostly soggy Poa annua with come struggling bent and bluegrass. With minimum irrigation, the introduction of new ryegrasses and improved bluegrasses, and a slow-release fertilizer program we now have nearly solid bluegrass fairways with no Poa annua. It took courage to let the fairways get dry but the Poa annua died and the other grasses held on. Water, when needed, was the secret of success.

In 1946 Jim Watson started his work on water on turf under the late Prof. Musser. His Ph.D. thesis summarized four years of work which said in effect,"Water as needed only so fast as the soil will absorb it". About the time aerification became feasible and we learned how to cultivate turfgrass soils to let more water into the soil. This was a big step forward in Water Management.

Drought years in 1963, 1964, and 1965 in the Northeast created an upsurge in the installation of irrigation systems. Water was thought to be the answer to the problem. A survey conducted in 1968 by Dr. Harper, Penn State, showed that irrigation produced a whole new set of problems.

77% reported decrease in Kentucky blue and red fescue
81% reported increase in Poa annua (some indicated 90 to 100%)
Height of cut had to be lowered
78% said that mowings were doubled
22% said that mowings were tripled
Weeds increased, there was more thatch build-up, new grasses had to be introduced, renovation became necessary, fungicide use increased, and fertilizer requirements doubled and trebled.

Water provides films around solid particles which act as a lubricant. With traffic the soil particles become rearranged in the direction of more compaction. Pore spaces were reduced from 33.1% to 6.1% in one study. The weight of the non-compacted soil was 68 pounds per cubic foot. After compact ion the same soil weighed 112 pounds.

Roots of turfgrasses have been found at considerable depths when there is good sub-surface drainage, where the soil is permeable and water has been used in moderation. In California the roots of Merion bluegrass were drawing moisture below 3 feet. Roots of bentgrasses on putting greens have been found to be active below 12 inches. The secret is permeability, good drainage, and good water management.

"Water as Needed" includes syringing to bring grasses out of a wilt condition. A quick syringe with cool water provides cooling and life-saving oxygen. More oxygen is dissolved in cool water than in warm water. Perhaps one great feature of automatic irrigation systems is the ability of the turfgrass manager to syringe all areas quickly early in the morning to wash off dew and water of guttation. Guttated water (that which is forced from openings in the plant by root pressure during the night) contains rich nutrients which is ideal for the growth of fungi. When left on the plant there may be burning of the leaves when the moisture evaporates and the salts are left behind on the leaves. Syringing washes these nutrients into the soil where they are recycled through the plants.

(To be continued in the next issue)