correctional drainage unnecessary. On the other hand, improvements in trenchers and the development of flexible plastic drain tubing have greatly reduced site disturbance and installation cost. Very few good farmers have yet to tile their fields. Turf managers should follow suit realizing the installation cost can be recouped in better drained and playable turf. Drainage also provides the manager with better control over the environment of the turf. Excessive surface moisture encourages disease and *Poa annua*. A savings in fungicides and herbicides is a possible result.

Fertilizers

The most recent development in fertilizers has been liquid formulations of ureaformaldehyde. Sulfur-coated urea preceded liquid UF.

The latest intent of chemical manufacturers has been to provide convenient nitrogen sources for applicators of liquid materials for turf, primarily the lawn care market. Their developments could be applied to fertigation, an area of large potential for well-irrigated turf areas. Liquid lawn care to golf courses has not proven practical so far.

Granular fertilizers remain the dominant nitrogen source. Some dry materials are available in a form suitable for liquid application.

Slow-release fertilizer technology currently exists which enables managers to reduce the number of seasonal fertilizer applications.

Combining fertilizer with insecticides and herbicides to reduce the number of applications is desirable. Large users may economize by buying quantities of individual chemicals and mixing them. This is simpler in liquid form. Buying custom blended dry products is less economical. Distribution of dry materials from broadcast spreaders may not be even if particle sizes and weights vary considerably.

Guidelines to mixing various dry materials to consolidate applications would be well received.

Growth Regulators

If you remember that growth regulators were actually the materials used to develop herbicides from, you wonder why they haven't progressed more than they have. Scientists have worked decades to reduce the yellowing effect of most growth regulators on turf. Managers of fine turf still hesitate to use them. Establishing low maintenance areas will encourage the use of growth retardants for roughs, roadsides, and parks.

Herbicides

The biggest headache in selective weed control remains grassy weeds such as yellow nutsedge and *Poa annua*. Basagran is registered for nutsedge but must be used with care to prevent burning desired turf.

Some specialists say we create our own weed problems with excessive fertilization and irrigation. Adjusting these maintenance practices should then help.

Properly timed use of preemergence herbicides certainly reduces postemergence treatments. Weed control is one of the areas that can benefit the most from integrating management practices. Keeping a good eye on the turf to identify problems early is advised, as is eliminating adjacent weed seed sources. Renovating a nearby field to tall fescue may be cheaper than endlessly fighting airborn weed seed. Hand removal of a few isolated weeds may eliminate the need for large area treatment later.

EQUIPMENT

National Mower Company

The historical flavor of the mower market can be sensed from the background of the National Mower Company of St. Paul, Minnesota, and its founder Robert Stanley Kincaid.

Kincaid received his degree in mechanical engineering from Purdue University in 1908. He grew up in Kentucky and appreciated the beauty and needs of turfgrasses. Kincaid's father became ill at the time of Stan's graduation and was hospitalized in Rochester, Minnesota. Since he hadn't yet taken a job, Kincaid decided to look for work in the Rochester area. He took a trolley to Minneapolis. When the conductor asked for additional fare he got off to look around. He noticed a manufacturing plant across the street and decided to check the company for job opportunities

Although he was an engineer, he accepted an apprenticeship at the plant for $1.25 per day. That company was Gas Traction Company, the first manufacturer of gasoline powered tractors in the world. Engineering developments there were applied to nearly all gasoline tractors to be built in the next 20 years.

Kincaid later worked in cooperation with John Deere, the early founders of Toro, and Briggs & Stratton. The northern central states were a hotbed of gasoline powered tractors in the teens. In 1916, a demonstration of tractors from Ford, International Harvestor and others was held in Nebraska. The conversion from steam to gasoline was now certain.

At this same time Kincaid began experimenting with gasoline-powered reel mowers. He developed a 40-inch mower for estates and helped solve early engine lubrication problems. All efforts were directed at war for the end of the decade.

In 1921, two years after he returned from the war, Kincaid began making small numbers of gasoline-powered mowers. He always resisted fancy and unnecessary cowling and concentrated instead on the engineering strength of his mowers. Gradually he built up production and his son John joined him.

Today, National makes some of the most rugged riding reel mowers in the business. These mowers had their origins with Toro's Bull Tractor and continue to play a growing role in mowing of fine turf. Kincaid strongly believes in doing a few things well rather than many things poorly.