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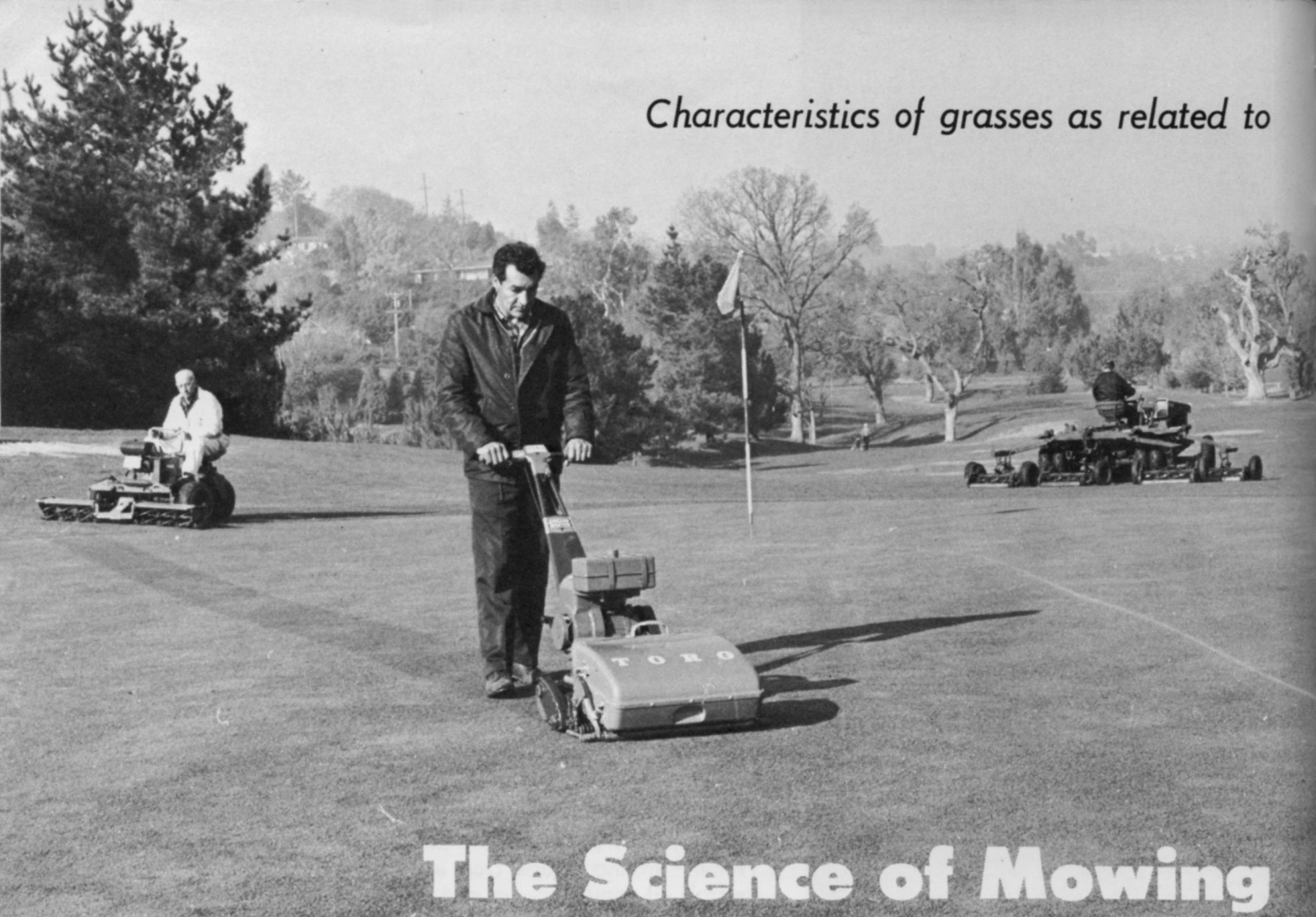
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The Science of Mowing

By J. R. Watson, Director of Marketing
Toro Manufacturing Corporation

GOOD MOWING practices are perhaps the most important single factor contributing to a well-groomed appearance and the longevity of any turfgrass.

Grass cutting is perhaps the major time consuming operation in the maintenance of turfgrass. The manner in which grass is cut also will greatly influence its health, vigor and density. These factors, along with an adapted grass, proper fertilization, aeration and judicious watering will determine the ultimate quality of turfgrass. All are instrumental in the degree of weed invasion which may occur and, collectively, they control the overall appearance of the lawn.

An understanding of the basic growth habits and characteristics of grass is essential for the development of proper mowing techniques.

Growth Habits

On the basis of growth type, grasses may be classified into three general groups:

Bunch-type grasses, such as ryegrass and chewing fescue, produce

new shoots which grow inside the sheaths of the previous stem growth. Stoloniferous grasses, such as bentgrass, spread by runners or stolons which develop from shoots that push through the sheath and run along the surface of the ground, rooting at the nodes (joints). Kentucky bluegrass, a rhizomatous type of grass, develops shoots at the underground nodes.

Some grasses, such as bermudagrass and zoysiagrass, spread by both rhizomes and stolons. This is one reason why bermudagrass is such a vigorous grower and is so difficult to control and keep out of flower beds, gravel walks and similar areas. There are, also, intermediate types with decumbent stems which root at the nodes, such as crabgrass, nimblewill and some fescues.

The grass leaf is adapted for intercepting a maximum of sun rays, which are essential for photosynthesis. The long flattened grass blades provide a maximum of exposure with a minimum amount of protoplasm, thus making efficient use of the living tissue.

A reduction in the plant leaf area exposed to sunlight reduces the plant's capacity to carry on photosynthetic activity. This is a vital and

basic consideration in determining the frequency and height of cut of turfgrasses.

The ability of grasses to withstand frequent and relatively close cutting is related to certain peculiarities of the grass family.

Grasses exhibit basal growth, as opposed to terminal growth found in most other plants. Basal growth means simply that growth initiates at the base rather than at the tip of the blade or stem. From a practical standpoint, this means that normal and frequent mowing does not cut off the growing areas of the grass leaf. Removal of too much leaf surface at any one cutting may, however, destroy some of the growing points.

Height of Cut

The height at which a given perennial grass can be cut and still survive for extended periods is directly related to its ability to produce sufficient leaf surface for the photosynthetic activity required for its growth.

Basically this ability is related to the inherent type and habit of growth found in the grass. The length of internodes, the number of stolons or rhizomes, and the number

of basal buds all influence the amount of leaf mass produced by a given grass; hence, affects its ability to withstand low heights of cut.

Creeping-type plants, such as bentgrass and bermudagrass, when properly fertilized and watered, are able to produce adequate leaf surface at very low heights of cut (3/16 inch). Buffalograss, although a creeper, cannot produce sufficient leaf mass at low heights because too few basal buds exist and, therefore, cannot withstand low clipping. For this same reason, Kentucky bluegrass and fescue must be cut relatively high (1 to 1½ inches). If bunch-type grasses are cut close, too much leaf surface is removed, and the plant can no longer carry on sufficient photosynthetic activity to sustain satisfactory growth.

Frequency of Cut

Frequency of mowing also is an important consideration in the maintenance program. Infrequent clipping allows the grass to elongate to such a degree that any subsequent clipping removes an excessive amount of leaf surface.

At no time should clipping amounts in excess of ¼ to ⅓ of the

total leaf surface be removed at a given mowing on lawns.

Removal of large amounts of leaf surface will result in a physiological shock to the plant, cause excessive graying or browning of the leaf tips, and greatly curtail the photosynthetic production of food. While this may not seriously damage the plant, it does cause the lawn to look "butchered."

In addition, the accumulation of excessive clippings may smother the grass and provide excellent environmental conditions for disease organisms and insects. The frequency of clipping must be governed by the amount of growth, which in turn is related to weather conditions, season of the year, soil fertility, moisture conditions and the natural growth rate of the grasses.

Stage of Growth

The stage of growth of turfgrass plays a major role in mowing practices. Young tender growth in the spring is generally soft and succulent. The moisture content of young immature turfgrass is much higher than that of mature grass. Likewise, the fiber content of young grass is much lower than that of

mature grass. Such a condition influences mowing practices.

Tender young grass must be cut with a sharp, well adjusted mower to avoid mechanical damage. The early growth must be cut frequently to avoid the problems associated with high moisture.

Mowing practices during the early stages of growth exert a material influence on density of turfgrass. Cutting at heights somewhat lower than normal during early spring will encourage lateral growth which, in turn, promotes density and helps prevent weed invasion. Such may cause a reduction in root depth and should not be continued indefinitely.

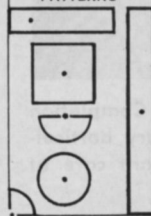
Mower Selection

Good mowers are characterized by high maneuverability, easy adjustment, durability and adequate horsepower for size and usage. In addition to these inherent design features, the ready availability of parts and service is important.

Two basic types of mowers are available—reel and rotary. Choice of a given type will be governed by the particular duties the unit will be expected to perform. Each type has certain advantages and limitations



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which should be carefully considered before final selection of a mower is made.

Reel-type mowers are always recommended for the cutting of formal and semi-formal turf areas, including golf greens, tees, fairways and lawns cut less than one inch. Reel-type gang mowers are, also, the most efficient and economical for mowing large open areas such as airfields and parks. The cutting action of the reel is like that of a pair of scissors.

Reels, when sharp and properly adjusted, give a clean even cut which cannot be equalled by any other type of mower. Certain kinds of grass should always be cut with reel type mowers. Bentgrasses and bermudagrasses used on putting greens are an example.

The use of reel type mowers may be limited in some turf areas because they require relatively smooth ground upon which to operate, and they will not cut tall, rank growing weeds. In addition, the cost of maintenance is somewhat higher than that of other types of mowers.

Rotary mowers are widely used. They are versatile and adapted for use on most home lawns. They are always recommended for rough con-

ditions and on areas where control of grass, rather than appearance, is the predominant consideration.

Rotaries also may be used to grind up leaves, cut tall stemmy weeds, and to trim. The rotary cuts by impact similar to the cutting action of a scythe. For this reason, a sharp, properly balanced blade is necessary to avoid ragged tearing of the grass blade and to prolong engine life.

Cutting with a dull blade generally results in a graying and subsequent browning of the leaf tip. When selecting a rotary mower, give particular attention to the safety features, the type of blade and method of blade mounting, ease of adjustment and horsepower.

Power requirements—the highest of any type of mower—and scalping on uneven or rough terrain, are the major limitations of rotary mowers. The cost of maintenance is low on the rotary unit, although the cost of engine maintenance may be much higher than on reel units, particularly if the unit is underpowered or used under dusty conditions.

Dashboard Effect

Turfgrass areas regularly cut with power mowers or gang mowers



sometimes develop a series of wave-like ridges running at right angles to the direction of mowing.

The development of this washboard effect may be prevented or partially remedied by regularly changing the direction of mowing (diagonal or right angles). Alternate directions of cut will partially control runners of creeping grasses and aid in the prevention of grain and thatch.

Prison Inmates Study Plant Care

Horticulture and arboriculture are part of the curriculum of Stateville Penitentiary, near Joliet, Ill.

Arborist-humanitarian Archibald E. Price of Glenview, Ill., became interested in rehabilitative prison work eight years ago, when he volunteered to organize and instruct classes in plant care. Since then, class membership has grown from 17 to 140, and instruction covers a complete range of horticultural subjects from gardening to greenhouse care.

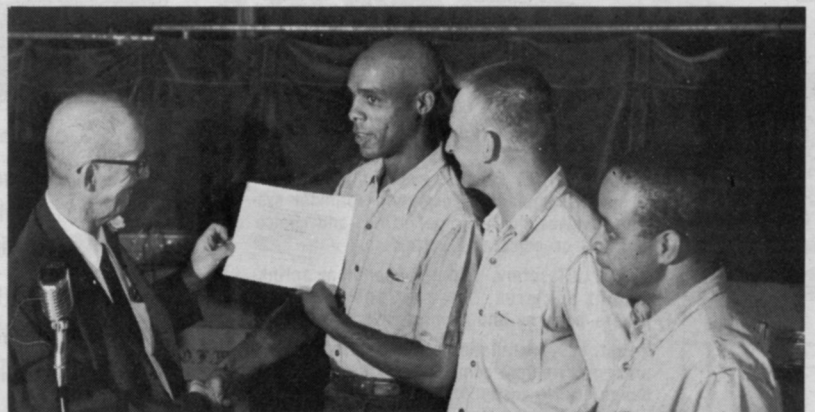
At the end of the 26-week course, Certificates of Completion are presented to those inmates who have finished the series.

Recently, Price received two awards recognizing his contribution to penal rehabilitation. These are the John Howard Association 1969 Award, and the Award of Outstanding Laymen in Correction, presented by the Illinois Probation, Parole and Correc-

tional Association.

The latter reads: "Citation to Archibald Enoch Price, in recognition of his humanitarian contribution and deep interest in the correctional process throughout

the State of Illinois penal system. The vocational training and guidance in the field of horticulture has been beneficial to a multitude of men returning to the community."



Archibald E. Price, left, Illinois arborist, presents Certificates of Completion to three men for their participation in the Stateville Penitentiary horticulture course. Price has been conducting a 26-week class in plant care at the Joliet, Ill., prison since 1961.



A very similar washboard appearance is often observed on turf areas, but is no fault of the mowing equipment or the operator. Many times land is plowed for seedbed preparation and not properly disked and leveled prior to seeding. Settling then takes place in the plow furrows and unevenness develops.

Such a situation may be reduced in severity over a period of years by heavy aeration followed by

dragging. The dragging operation generally will remove most of the soil cores from the high areas and deposit them in the low areas.

Wet Conditions

Mowing wet grass should be avoided as much as possible, although available labor and time often make it impractical to do so. Dry grass cuts more easily, does not ball up and clog the mower, and gives a much finer appearing lawn. Timing tests show that mowing dry grass requires less time than mowing wet grass.

Uneven Terrain

Mowers are not built for grading purposes. Turf areas containing high areas which are continually scalped should be regraded so they may be cut properly and to reduce the wear and possible damage to mowing equipment.

Inadequate insect control can become a serious mowing problem. Areas heavily infested with earthworms or ants will have many soil mounds caused by their activity which will result in a poor appearing area and will cause damage to

mowing units. Mounds of earth thrown up by gophers and other soil burrowing animals will have the same result.

Improper Operation

Irregular or uneven cutting often occurs from the bobbing motion of mowing units. This may be caused by mowing at excessive speeds or by equipment not built correctly for the grass it is cutting. This often occurs where the grass is extremely heavy or dense and the mower, because of insufficient weight and/or cutting ability, bobs up as the mower hits heavy grass.

On specialized areas, such as putting greens, bowling greens, lawn tennis courts, etc., improper handling of the mower on turns will result in turf damage through bruising and wearing of the grass.

Terraces and Banks

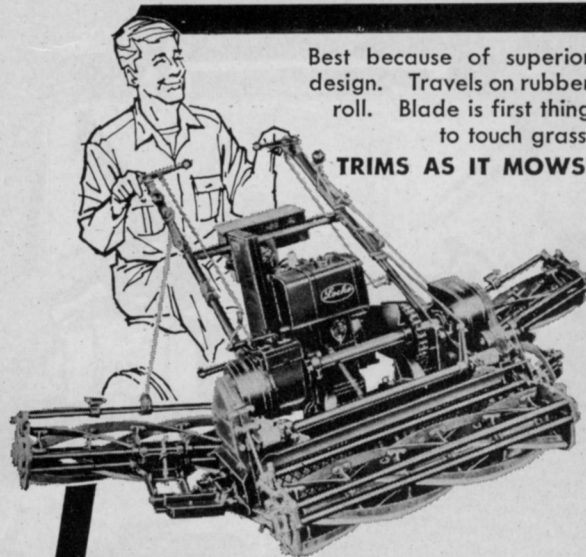
Terraces and banks offer a difficult mowing problem. Scalping generally will occur if the bank or terrace is mowed across the slope. Up and down mowing generally is the most satisfactory method of cutting these areas.

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By STANLEY E. METSKER
Golf Course Superintendent
Boulder, Colo., Country Club

Maintenance choice is clear:

Lubricate Or Languish



Author Stanley Metsker, left, is getting lubrication recommendations on an H. D. Hudson Company sprayer from sales representative Cooper B. Baldrige of Memphis, Tenn.

ANYONE who is responsible for the care of machinery must know something about lubrication.

The life and service of a machine depends to a large extent upon the care it is given. It is a constant problem to see that each need is met with the proper lubricant at the proper time and in the proper amount. Results of neglect are expensive.

Lubricants generally are either an oil or a grease. An oil has four specific functions to serve in the modern engine. It must lubricate, seal, cool and cleanse. To perform its most important function, that of lubricating, the oil must possess three properties, the ability to:

- make surfaces “slippery;”
- adhere to metal surfaces;
- maintain a lubricating film between all friction surfaces under varying extremes of pressure and temperature.

Sometimes certain chemicals are added to oils to help take care of specific problems. These chemicals are called additives. Among reasons they are added are to:

- better protect bearings;
- resist oxidation of the oil;
- better resist wear;
- better disperse the oil;
- hold dirt in suspension (detergents);
- make the oil flow better;
- make the oil thicker;
- keep the oil from foaming;
- resist rust.

Fortunately most of us never have to worry about which additive to use. Oil companies make oils to do certain jobs and add the additives accordingly.

All you have to do to take advantage of these additives is to buy good oil from a good company in the MM or MS class. Oil classifications are explained later. Remember that oils for severe operating conditions will contain more additives than the oils for light duty and will therefore cost more.

Detergent Oils

Detergent oils are generally used in all but the lightest of engine applications. Detergents in oils dissolve gummy or resinous deposits and even more important they keep the minute solid particles formed by fuel and oil deterioration in suspension so they will be drained out with the oil change instead of being left in the engine.

A reasonable oil change practice is a money-saving practice. The secret to using these detergent oils to their fullest potential is to change

them before they become overloaded with dirt. Because this type of oil keeps carbonaceous material in the crankcase in suspension, it becomes discolored sooner than would straight mineral-type oil. Oil color, therefore, loses its meaning as a means of determining oil cleanliness.

Detergent oil is not recommended for use if your engine has been in service for a long time using non-detergent oils, because the contaminants it loosens in the system by its purging action may cause plugging of the oil lines and oil pump screen, resulting in damage to your engine. Under normal operating conditions, oil should be changed every 100 hours in a tractor.

What API Ratings Mean

The American Petroleum Institute (API) lists the following motor oil classifications for gasoline engines:

ML — Light duty, favorable operating conditions for mild engines with no abnormal lubrication requirements.

MM — Moderate to severe operating conditions where deposits or bearing corrosion may be a problem when crankcase oil temperatures are high.

MS — Unfavorable or severe operating conditions where there are special lubrication requirements for deposits, wear, or bearing corrosion control, due to operating conditions or engine design or fuel characteristics.

Current automotive engine design and motorist driving habits would fall in the MS category. An MS type oil should be used in most tractors and even in most single-cylinder engines.

The Society of Automotive Engineers (SAE) classification indicates the viscosity of an oil. An SAE 10 would be thinner than an SAE 30 oil. SAE 10-20-30 can be used all year long.

In addition to the oils mentioned above, some of the following special use oils may be needed:

— Penetrating oil, for loosening tight nuts and bolts;

— Cutting oil, for making threads on pipes or bolts;

— Turbine pump oil, a highly-refined oil for turbine pump motors;

— Gear oils, for transmissions, differentials and gear boxes.

The best advice on how to take care of your machinery comes in the form of a booklet which is sent

along with the machine. These instruction booklets should be kept for future reference.

The purpose of any lubricant is to reduce friction between two moving parts.

To keep two metal surfaces separated, the lubricant must keep the metal wet with oil and resist being displaced by pressure. A lubricating grease must also serve other purposes such as cooling, prevent corrosion and keep out contaminants. For most purposes a multi-purpose grease can be used.

The Jacobsen Turf King triplex mower is a good example of a machine with many different lubrication requirements. The sealed bearing that acts as a V-belt idler for the belt running to the front reel never needs to be greased. In contrast, the bearings at each end of the shaft that hold the rollers for the mowing units need grease every four hours the machine is run. Other bearings on this machine need grease at other intervals.

Follow Makers Instructions

Each machine has definite needs and can only perform at its best when the manufacturer's instructions are carefully followed.

A WORD OF CAUTION: If you use water or steam to clean equipment, be careful about forcing water into bearings. It is a good idea to grease the equipment after washing to force water out of the bearings. Also, keep water out of the air filter.

Constant lubrication is necessary but over-lubrication is also bad.

Some men put so much grease into motors that they would fail from excess grease clogging up the windings. Over-greasing also can push out grease seals and let in dirt.

Following is a list of lubricants that you generally need for turf-grass equipment:

Oils—Motor oils of class MS. An SAE 30 oil for summer and a 10 or 20 for winter, or 10-20-30 year around. Outboard motor oil for two cycle engines. SAE 90 or 140 oil for gear boxes. Hydraulic oil. Penetrating oil. Cutting oil. Turbine pump oil. Other special oils for special cases.

Grease—Water pump grease is sometimes needed, but for most jobs a multi-purpose grease will do.

Lubrication is a job that must be done. When done right, you will have equipment that runs better, longer and cheaper. You must lubricate or languish in the mire of your own neglect.

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At the recent 39th Annual Michigan Turfgrass Conference, Thomas H. Gauthier, right, (left picture) received the Certificate of Scholarship Award from the Golf Course Superintendents Association of America. Presenting the award was Norman Kramer, Association vice-president. The award was made for outstanding achievement in Michigan State University's turfgrass management course. The two-year



technical course is offered by the University's Institute of Agricultural Technology. In the picture at right, Clarence Wolfrom received the third annual Meritorious Service Award. Frank Forier, right, and James Standish, Michigan Turfgrass Foundation president and executive secretary, respectively, made the presentation. Wolfrom was honored for his contribution to Michigan's turfgrass industry.

Six States' Growers Form Midwest Turfgrass Assn.; Joe McDermott Is President

Growers from six states have formed the Midwest Turfgrass Growers Association, with headquarters in Kansas City, Mo.

Representatives from Nebraska, Missouri, Illinois, Kansas, Iowa and Colorado organized at a meeting Apr. 22 in St. Joseph, Mo.

The regional group is "not a substitute for the national organization," explained elected president Joe McDermott, Loveland Lawns, Omaha, Neb. Rather, he added, it is a step toward an organized approach to dealing with problems unique to

the region, such as local tax and water problems.

"Since the exploration by Lewis and Clark," said McDermott, "the Midwest has been known for its billowing bluegrasses. Present expansion of nursery-grown bluegrass acreage is so great that the formation of the association was imperative.

"We'll be working closely with state universities to tackle the maze of growing problems confronting this expanding industry."

Officers elected with McDermott are: Vice-president, Ed Keeven, Emerald View Sod Farms, O'Fallon, Mo.; and secretary-treasurer, William Latta, Princeton Turf of Kansas City.

Two-year directors are Claude Wiewel, Wiewel's Blue Grass, Quincy, Ill.; Melvin Briggs, Briggs Turf Farm, Stillwell, Kan.; and Don White, White Turf Farm, Des Moines, Ia.

One-year directors are: Jack Meyers, Meyers Turf Farms, Inc., Stillwell, Kan.; Bob Bechtold, Bechtold Landscaping, Columbia, Mo.; and Melvin Rich, Richlawn Turf Farms, Denver, Colo.

Another purpose of the Midwest group, said Latta, is to "promote and up-grade research and quality in the sod-growing and sod-installation industry."

Kansas City was selected as the association's headquarters, said Latta, because of its central location and the fact that three of the directors are from the immediate area.

Features Are Announced For 45th Tree Conference

"Beautify With Trees" is the theme of the 45th International Shade Tree Conference.

The five-day event, Aug. 10-15, will be at the Hilton Hotel at Portland, Ore. Riley Stevens, president, Stevens Tree Surgery, is chairman.

Activities begin with a hospitality session Sunday evening, at the Hilton, courtesy of the Western Chapter of the Shade Tree Conference.

Delegates will feast at a salmon barbecue Monday evening on the beach at Gearhart.

Although the name is yet to be announced, an international authority on trees will be the keynoter at the Aug. 12 noon luncheon.

Equipment suppliers will demonstrate the newest and best of their merchandise Aug. 13 in Westmoreland Park.

Thursday night's annual banquet will feature The New Oregon Singers, a group of entertainers who have entertained U.S. troops in Vietnam and recently completed a world tour.

For the women, tours of the city will include Portland's International Rose Test Gardens and Lloyd Center, the world's largest shopping center. Other tours will include a trip up the Columbia Gorge with lunch at Multnomah Falls and a visit to Bonneville Dam.

Post convention tours include deep sea fishing excursions, a tour around Mt. Hood, an Alaska tour and a Canadian Rockies tour.

New WTT Staff Member

Alis Anthony joined the staff of WEEDS TREES and TURF magazine on Apr. 14 as an editorial assistant.

She succeeds Kathy Thomas who resigned on May 1.

Miss Anthony is a graduate of Wittenberg University at Springfield, Ohio. She holds a bachelor degree in education.

Since graduation, she has worked in the newspaper, trade magazine, and book publishing fields.

Meeting Dates



Dates for this column need to reach the editor's desk by the 10th of the month preceding the date of publication.

Central Plains Field Day, Central Plains Turfgrass Foundation, Research Plots, Kansas State University, Manhattan, Kan., June 2.

Turf Research Field Day, Rutgers State University College of Agriculture and Environmental Science, New Brunswick., N.J., June 11.

Hyacinth Control Society ninth annual meeting at the Holiday Inn, Palm Beach, Fla., June 15-18.

Michigan Association of Municipal Cemeteries, 9th Annual Conference, Holiday Inn, Traverse City, Mich., June 20-21.

Annual Meeting, American Society of Agricultural Engineers, Purdue University, Lafayette, Ind., June 23-25.

National Fertilizer Solutions Association, Round - Up Program, Ridpath Hotel, Spokane, Wash., July 8-10.

National Fertilizer Solutions Association, Round - Up Program, Hotel Muehlebach, Kansas City, Mo., July 22-23.

American Sod Producers Association, Third Annual Field Days, College of Agriculture and Environmental Science, Rutgers University, New Brunswick, N.J., and Princeton Turf Farms, Cranbury, N.J., Aug. 4-5.

Turfgrass Field Day, U.S. Department of Agriculture, at the Agricultural Research Center, Beltsville, Md., Aug. 6.

45th International Shade Tree Conference, Hilton Hotel, Portland, Ore., Aug. 10-15.

National Fertilizer Solutions Association, Round - Up Program, Marriott Motor Inn, Atlanta, Ga., Aug. 13-14.

Golf Course Superintendents Field Day, University of Rhode Island, Kingston, R.I., Aug. 20.

Lawn and Utility Turf Field Day, University of Rhode Island, Kingston, R.I., Aug. 21.

Turfgrass Management Conference, Hawaii Turfgrass Association, East West Center, University of Hawaii, Honolulu, Hawaii, Aug. 27-29.

Annual Turfgrass Field Day, Michigan State University, East Lansing, Sept. 4.

Lawn and Ornamental Days, The Ohio Agricultural Research and Development Center, Wooster, Sept. 9-10.

Michigan State University Sod Producers' first field day at the Much Experimental Farm northeast of East Lansing, Sept. 10.

Virginia Cultivated Turfgrass Association sod field day at the Kidwell farm near Remington, Va., just off U.S. 29, Sept. 14.

Central Plains Turf Conference, Kansas State University, Ramada Inn, Manhattan, Kan., Oct. 15-17.

National Fertilizer Solutions Association, National Convention and Equipment Exhibition, Cincinnati Convention Center, Cincinnati, Ohio, Nov. 9-13.



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