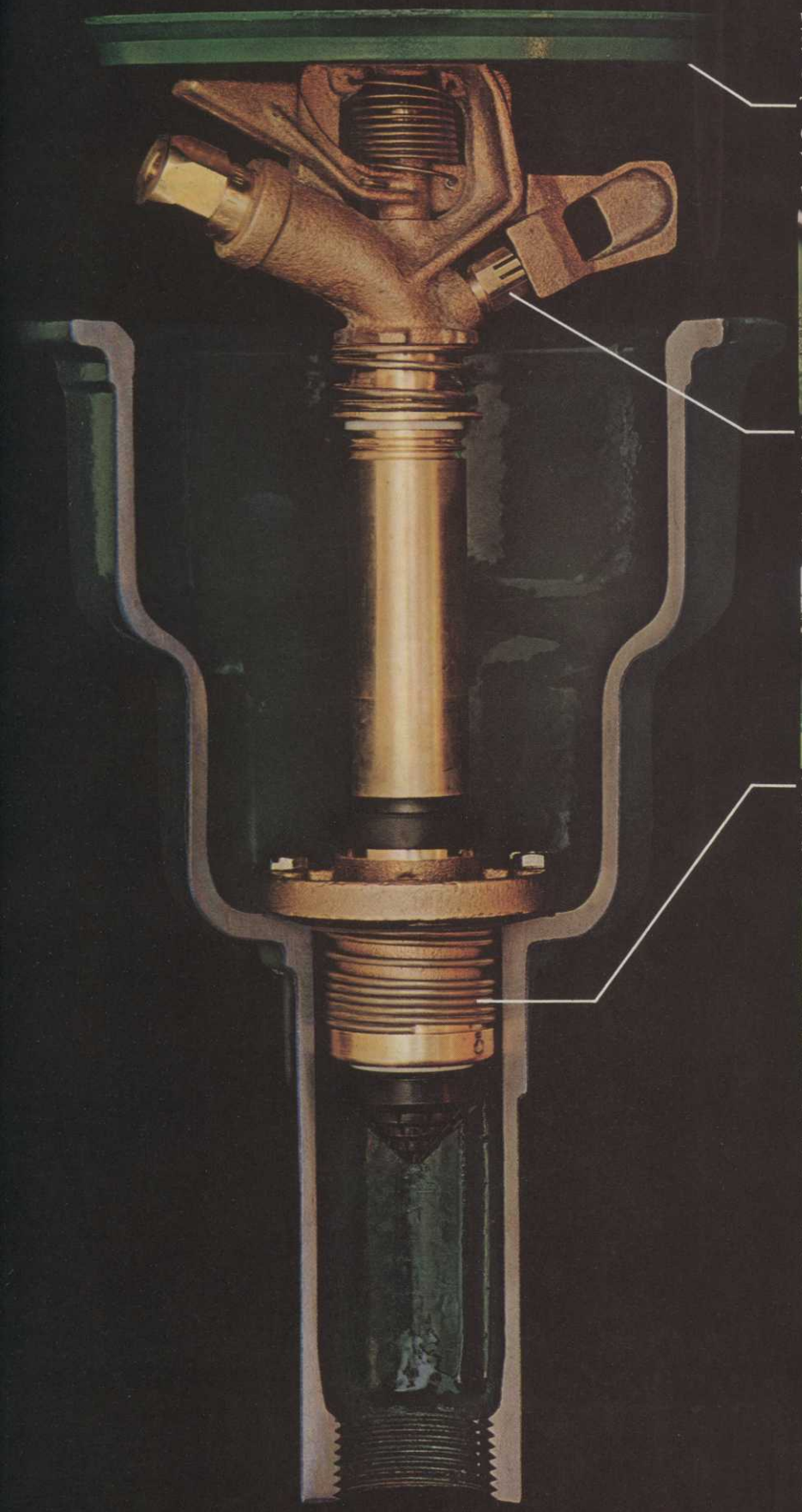
And the green grass grows all around



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Protection, Service and . . . Profit

Everybody stands to gain from a reported trend in our industry — a noticeable increase in purchase of lightning protection materials for trees by arborists and supply houses. Obviously, a growing number of tree protection systems are being installed by people in an excellent position to do so properly and profitably — arborists or tree experts.

The benefits to customers are great for lightning is a major crippler and destroyer of trees and the danger is greatest to those shade and specimen trees that are oldest, tallest, and most valuable. Future generations benefit, too, when historic and irreplaceable trees are protected.

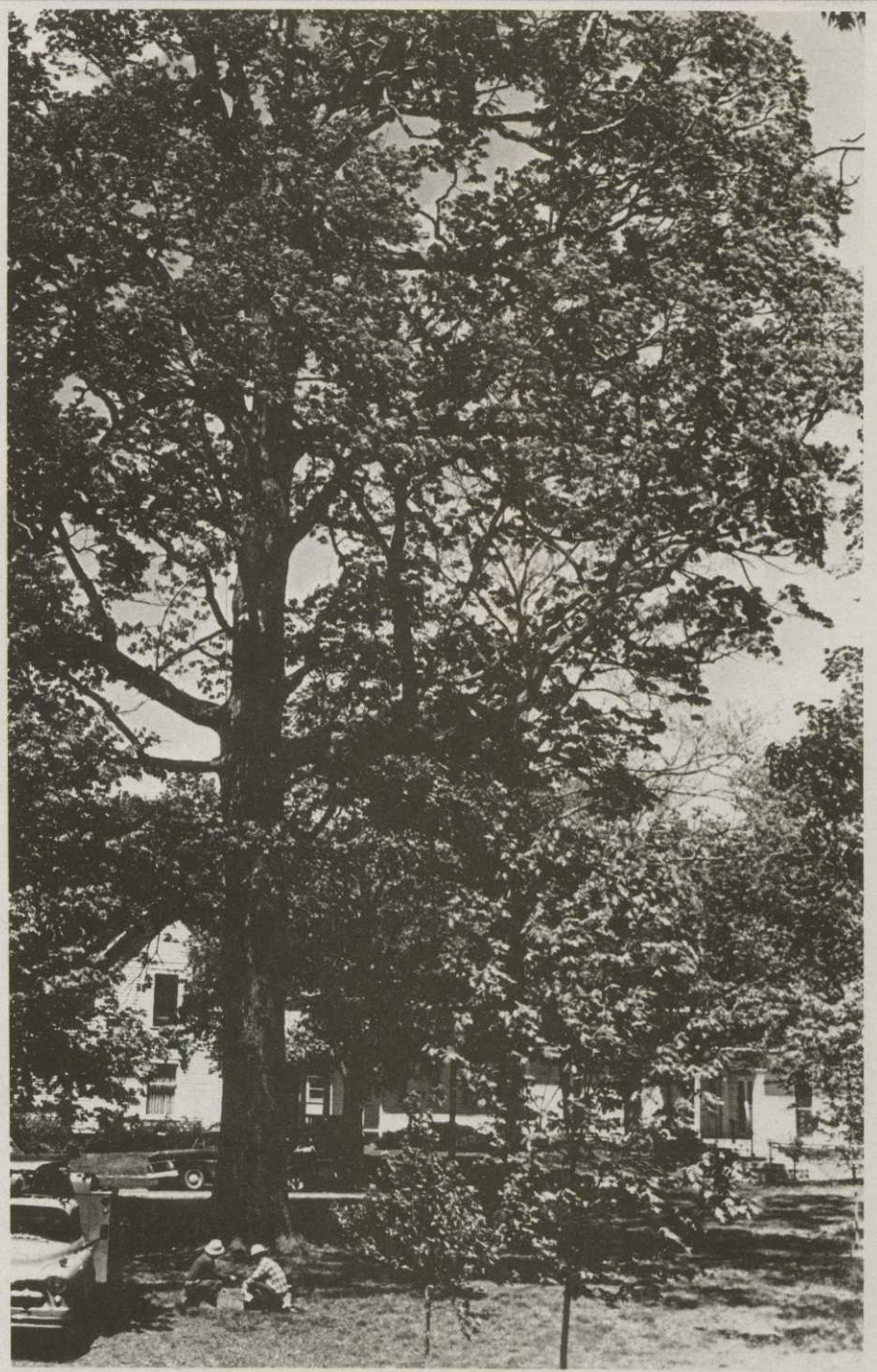
And there are at least a half dozen advantages for us. I have been interested in lightning protection for valuable trees since my early training in the '30's and feel an obligation to advise customers to protect their trees against this danger. We have found that we have gained in the following ways from our lightning protection work with trees:

1. Added business is gained without much additional investment for our trucks, ladders and tools are largely the same.

2. Installation techniques and skills also fit our current knowledge and training. Methods of fastening equipment to trees are quickly learned by our crews. In fact, a skilled climber is in demand in the lightning protection installation business as well as in ours.

3. Lightning protection work is profitable for manufacturer-suppliers furnish counsel and even layouts, as well as special materials when and as needed.

4. Sales leads come naturally and easily for customers whose trees have been damaged by lightning come to us.



The bigger and more valuable the tree, the likelier target it is for lightning injury or destruction. This large white oak in Indiana, a huge specimen of the species found to be struck most often, is in an area of above-average thunderstorm activity. Its protection was a sizeable job.

By JOHN Z. DULING, Duling Tree Expert Co., Muncie, Ind.

Lightning protection installation comes naturally. It fits the knowledge, tools, skill and experience of tree climbers.

This is a lightning protection air terminal, manufactured and designed specially for trees.

5. There is great satisfaction, I find, in furnishing to customers a means of preventing damage, as an alternative to repairing it after lightning has struck, provided it is repairable.

6. Finally, lightning protection materials, equipment, sales, methods and manpower all fit so well with our basic business that it can be encompassed profitably in an over-all business sense. You can offer a valuable service as a profitable expansion

Why and How Lightning Strikes

Lightning strikes trees because they are better conductors than air. Trees most likely to be struck are lone trees, the tallest in a grove, those at the edge of a grove toward an approaching storm, and trees located close to buildings where wiring or plumbing might enhance ground conductivity.

From thousands of lightning property losses reported over a two-year period, the LPI picked 1,000 losses, large and small, in which the lightning bolt's point of entry into the house was known. In 112 of those cases, or 11.2 percent, the bolt first struck a tree, then flashed to the house in search of better ground.

Lightning codes require the house to be fully protected with separate protection on each tree taller than the house which is within ten feet of the building.

Safety a Major Factor

The need to preserve trees of historic or sentimental value has, in the past, been the main motivation for installing protective equipment. However, other factors, such as the desire to protect buildings, cars, and people from the damaging side effects of a lightning bolt striking a tree may enter into the picture.

From 80 to 90 percent of all live-

stock deaths in the United States are caused by lightning bolts. Among cattle, one-third of such deaths occur under trees where the animals have sought shelter.

It is reported that more oaks are struck than any other species. But, there may be more oaks in heavier storm areas. All other factors equal, a tulip tree in a grove of trees containing all species is said to be the likeliest target.

A study has shown that the species most often struck by lightning to be in this order: oak, elm, pine, tulip tree, poplar, ash, maple, sycamore, hemlock, and spruce. Species struck least often are beech, birch, and horse chestnut.

Golf courses lead as sites of outdoor lightning casualties, both those under trees and in open shelters; course owners could equip trees, as well as shelter houses, with lightning protection. So could picnic ground owners, park boards or managers and many home owners.

Probably the biggest single factor in the increase in lightning protection installations is the fact that a turning point has been reached where generally it is more expensive to remove a lightning struck tree than to protect one.

In new outlying residential areas, particularly, real estate appraisals put values on trees that, when viewed against their increasing vulnerability to lightning as they grow taller, makes protection very wise and desirable.

How Installations Are Made

There are several codes and standards covering lightning protection installations for trees. The National Arborist Association now has a standard; the National Fire Protection Association's Lightning Protection Code has a section on tree protection, as does Underwriters Laboratories' Master Label Requirements. The Lightning Protection Institute's new Code includes this tree protection standard:

One main cable should be coursed from the air terminal at the top of the main trunk or branch to the ground terminal. Acceptable secondary conductors should be coursed from miniature branch points, as far out on the main branches as possible to the main conductor on the tree trunk.

To avoid possible injury to roots by locating depth grounding near trunks of trees, the conductor should be extended out and away from the base of a tree in a shallow trench to a distance of not less than 12 feet or to the extremity of the overhanging branches. This conductor should terminate in a ground terminal. (It should be kept in mind that usually the underground spread of the roots of the tree is equal in area to the spread of the tree branches above ground.) Depth groundings should be made outside the area of the root spread.

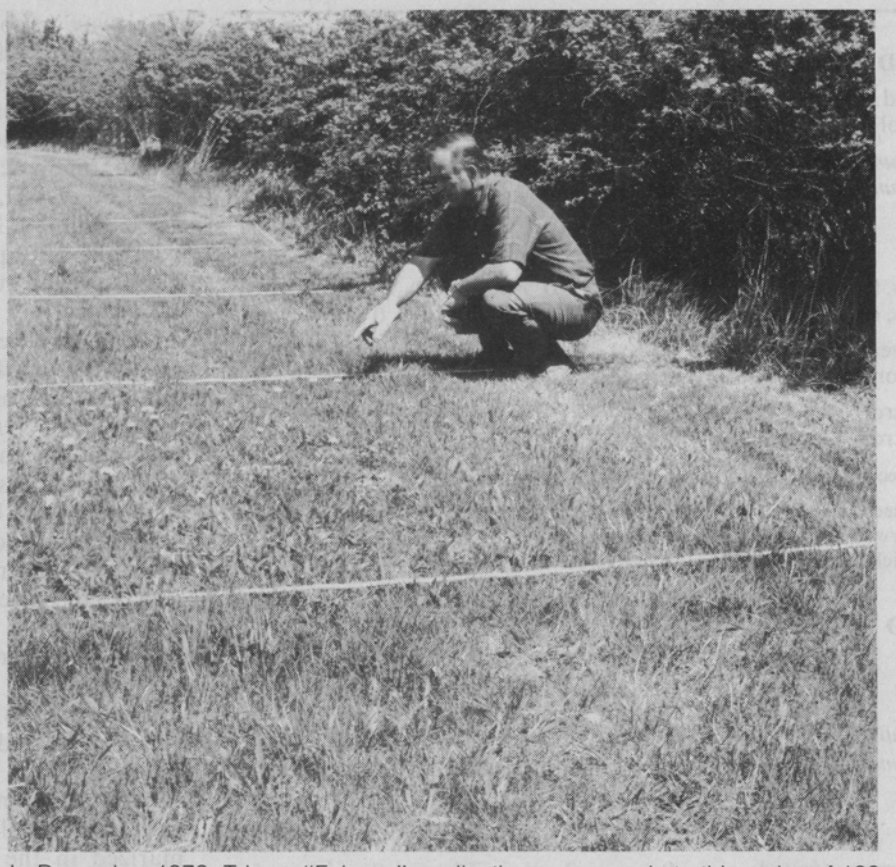
If the grounding on a protected building is within 25 feet of the tree, the two systems should be interconnected. If the tree or grounding of the tree is within 25 feet of a water pipe or a deep-well casing, a connection should be made between them.

Trees with trunks which exceed 3 feet in diameter, and which have extra long branches, should have two down conductors. They should be led down opposite sides of the tree and connected to the two ground terminals. These two ground terminals may well be joined by a circular or semi-circular conductor or a counterpoise buried in a shallow trench.

If there are several trees in a row (all major trees), the ground terminals of two trees not more than 80 feet apart may be interconnected by a trench conductor coursed to the base of each intermediate tree. The down conductor of each intermediate tree may connect with the 'trenched' interconnecting conductor. This practice avoids making independent groundings for each tree.

According to Code recommendations, two down-conductors are needed for large trees having trunks more than three feet in diameter. Cables lead from air terminals at top and on main branches to at least two grounds, located outside main root system.

This outstanding banyan tree in Cypress Gardens, Fla., is now protected against lightning. Installation was made during the National Arborist Association meeting in Tampa last winter.



In December 1973, Trimec "Fairway" applications were made to this series of 100 square foot test plots in 9 replications for "heavy" rate and 5 replications at normal dilution. The plot in the foreground and the one immediately behind the figure were treated. A check plot is in front of the figure.

Cool Weather Weed Control

By ROBERT W. SCHERY, Director, The Lawn Institute

We have had great success with late autumn or early winter broadleaf weed control, using a synergistic combination of herbicides of the Trimec or Trex-San type. These effective broadleaf weed controls widely used on golf courses seem destined for homeowner availability as well.

The basic components are the well-proven 2,4-D, MCPP, and dicamba herbicides. They are carefully combined in proportions that research has proven especially effective, resulting in a formulation that "packs more power" than the sum of its components. This is synergism, of course, in which two or more compounds working in tandem enhance the effectiveness of one another. As a result Trimec usually controls more weeds, at lighter rates, than would an equivalent concentration of any single component, — and with consequent greater safety. For added assurance on "touchy" species such as bentgrasses, a special "Bentgrass" formulation steps up the MCPP proportioning over that in the "Fairway" formulation so much used for bluegrass-based sods. Still a third formulation is offered for southern grasses such as St. Augustine. In all cases the herbicides come as a stabilized concentrate requiring only addition of the requisite amount of water. This avoids "workshed chemistry" difficult for inexperienced help unfamiliar with mixing accurately compounds of varying strength and formulation.

At the Lawn Institute we have been well impressed through the years with "season-end" control of broadleaf weeds. Sprayings made earlier — in late summer or autumn — kill existing weeds, of course, but seem not to catch the late-starting dandelions, plantains, chickweeds, veronicas, and suchlike. Measured by the frequency of weeds in the next spring's lawn, treatments made after mid October have usually shown up better than earlier ones. Not only will the later treatment conquer almost all of the weeds destined to sprout for the year, but it takes advantage of a relatively slack season (when mowing is through, and labor demands have materially eased). Phenoxy herbicides alone are not too potent in cooler weather, so that certainly late treatment should include some dicamba. Although Trimec-type formulations are essentially non-volatile, even in warm weather in my experience, an added safety factor with late-season use is that the deciduous ornamentals have finished their growing season and will not sustain drift damage such as might occur when buds are bursting and tender new foliage is exposed.

Although herbicidal control of winter weeds such as annual veronica, rosette crucifers, and volunteer dandelions in shrub beds as well as in lawns had proven most successful, we decided to conduct more elaborate late-season testing in 1973. Thus in early December Trimec

WEEDS CHECKED	REPLICATES 1	2	3	4	5	6	7	8	9	TOTAL
Plantago spp., treated	1	22	33	30	6	8	12	7	7	127
Plantago spp., control	11	13	20	40	43	39	10	35	7	218
Dandelion, *Taraxacum*, treated	1	1	1	3	2	1	1	17	8	35
Dandelion, *Taraxacum*, control	6	10	14	12	12	3	16	40	40	153
Prunella, treated	0	4	12	20	0	0	0	8	0	44
Prunella, control	18	5	100+	0	0	17	30	4	0	174+
Wild Carrot, *Daucus*, treated	0	0	0	0	0	0	0	0	0	0
Wild Carrot, *Daucus*, control	10	0	0	2	2	0	0	0	0	14
Other *Compositae*, treated	0	1	1	0	0	0	0	4	3	9
Other *Compositae*, control	3	0	3	2	0	1	5	4	5	23
Rushes, *Juncus*, control	} No talley								Almost none	
Rushes, *Juncus*, control									Abundant	

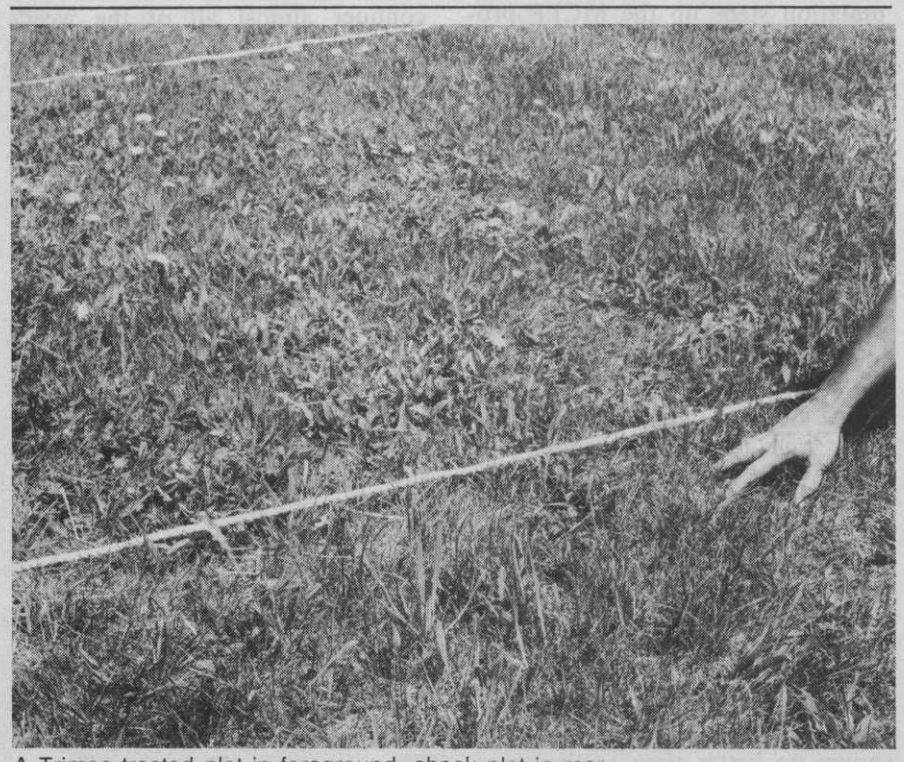
Weeds in all treated plots, 215 — in all controls, 582

Table 1. Exemplary weed counts on April 29, for treatments made previous December 1, using 6 ounces of Fairway Trimec in 3 gallons of water sprayed over 1,000 square feet. Talleys are from "quick counts" in a 5-foot band across center of plot.

WEEDS CHECKED	REPLICATES 1	2	3	4	TOTAL
Plantago spp. treated	32	20	22	16	90
Plantago spp. control	11	5	6	34	56
Dandelion, *Taraxacum*, treated	15	6	0	1	22
Dandelion, *Taraxacum*, control	13	31	19	3	66
Prunella, treated	0	0	0	0	0
Prunella, control	13	75	0	21	109
Other *Compositae* & misc., treated	0	2	3	0	5
Other *Compositae* & misc., control	8	13	2	0	23
Rushes, *Juncus*, treated	} No talley				Almost none
Rushes, *Juncus*, control					abundant

Weeds in all treated plots 117 — in all controls 254

Table 2. Exemplary weed counts on April 29, for treatments made previous December 2, using 2 ounces of Fairway Trimec in 3 gallons of water sprayed over 1,000 square feet. Talleys are from "quick counts" in a 5-foot band across center of plot.



A Trimec treated plot in foreground, check plot in rear.

"Fairway" applications were made to a series of 100 square foot plots in 9 replications for "heavy" rate and five replications at "normal" dilution. This particular Trimec formulation, on an active ingredient basis, is 27.6% 2,4-D, 13.8% MCPP, and 2.8% dicamba. Plots alternated with controls of equal size, and were hand sprayed at the rate of 6 ounces of Trimec in 3 gallons of water per 1,000 square feet for the heavier rate (2 ounces for the lighter rate). The test turf had been mowed but not weeded nor fertilized through the exceptionally rainy Ohio summer of 1973. Several severe nightly frosts had occurred, but the season as a whole was moderate and amply moist. Such grass as was present remained quite green, but warm-weather weeds were giving ground. The most evident broadleaf weeds in the test area at this time were narrowleaf plantain *(Plantago lanceolata)* and selfheal *(Prunella vulgaris)*.

Results from these treatments, as measured April 29, 1974, are summarized in the tables. The photographs show that weed control from the December sprayings stood out quite well into spring, even though any treatment is bound to be "temporary" where little grass exists to fill space vacated by the weeds. Even so, weed count showed about a two-thirds reduction at the heavier herbicide rate, and about half at the lighter rate. Plantains (both *P. major* and *P. lanceolata)* were the weeds least controlled, perhaps indicating the importance of dicamba in the formulation (dicamba is not particularly effective against plantain). But what was most surprising was thorough elimination of rushes *(Juncus spp.)* in the treated plots. Rushes are bunchy monocots looking a lot like fine fescue when young, but stiff and hard to mow. Rushes had become quite numerous in the test area during the wet cycle of 1972-73, but (mixing among a scattering of grasses) were paid scant heed, overshadowed as they were by the broadleaf weeds. If the rushes had been included in our tally, weed control statistics would have been even more impressive, since there were literally hundreds of rush plants in each of the check sections, almost none in the treated sections. Of course there is no damage to monocots in the grass family from the Trimec assemblage of herbicides.

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If you've seen a totally TORO golf course lately, we'll let the results speak for themselves. If you haven't, let us tell you more. Write TORO Irrigation Division, Dept. W-974, P.O. Box 489, Riverside, CA 92502.

ASPA Convention Report

The Growing Sod Market

"The market is so good but the soil is so bad, that we would grow sod on the walls to meet the demand," John R. Hall said as he addressed members of the American Sod Producers Association (ASPA) at its summer convention July 16 to 18 at New Carrollton, Maryland.

Hall, secretary of the Maryland Turfgrass Association and turfgrass specialist at the University of Maryland, outlining the sod market in Maryland said the state's 80 sod growers made sod production the fourth most important agronomic crop last year. He also presented the group with statistics on housing starts, average family income and potential population growth to prove just how good their commercial sod market is. Maryland's Sod Certification Program, Hall continued, stimulates good management practices, provides for the best varieties of sods and good pest control; and benefits not only the producer but the installer and consumer.

But the modern sod grower is not just confronted with ever-changing problems of an uncertain economy. During their annual business meeting Wednesday morning, members faced a dilemma of serious concern to their national organization. Jack Kidwell, then-president of the association, asked members to interpret a section of their basic constitution that could alter the course and function of ASPA.

In brief, members were asked to take a position on whether or not to include sod installers as "incidental to the production of sod and thus remain within the definition of agriculture."

Several members voiced opinions pro and con. Some questioned the position as being prejudicial to the interests of their customers, namely sod installation contractors. Others cited the ASPA constitution defining a member as anyone involved in the 'production, maintenance or marketing of sod.'

Kidwell said the producer members would receive a questionnaire asking them to indicate their position on the issue. The ballots would be tabulated and the associa-

(continued on page 26)

A special exhibit area in hotel featured the latest developments in sod harvesting and handling equipment. Here ASPA members chat with commercial representatives.

Under the critical eye of sod producers and installers, this harvester gets a tough workout on some of Maryland's dry, rocky soil. This equipment demonstration took place at Dick White's Sod Farm.

meeting dates

Virginia Tech Field Days, Turf Research Center, Blacksburg, Va., Sept. 18-19.

International Pesticide Applicators Association, convention, Seattle, Wash., Sept. 18-21.

Mississippi Turfgrass Conference, Holiday Inn, Biloxi, Miss., Sept. 23.

Arkansas Turfgrass Field Day and Conference, Little Rock Country Club, Little Rock, Ark., Sept. 24-25.

American Association of Botanical Gardens and Arboreta, annual meeting, Sheraton Hotel, Boston, Mass., Oct. 4-8.

New Jersey Golf Course Superintendents Association, turfgrass supplies and equipment field day, Montclair Golf Club, West Orange, N.J., Oct. 7.

National Institute of Parks and Grounds Maintenance, fourth annual meeting, Pittsburgh Hilton, Pittsburgh, Pa., Oct. 7-10.

American Horticultural Society Congress, Washington, D.C., Oct. 9-12.

Rocky Mountain Regional Turf Equipment and Product Show, Adams County Fairgrounds Exhibit Hall, Brighton, Colo., Oct. 10.

Southwest Turfgrass Conference, New Mexico State University, Las Cruces, N. Mex., Oct. 10-11.

Central California Regional Meeting, Western Chapter of the International Shade Tree Council, Community Center Bldg., Reedley, Calif., Oct. 11.

Hortiscope International Short Course "74" (Oct. 10-12) and **1974 Florida Nursery and Allied Trades Show** (Oct. 11-13), Curtis Hixon Convention Center, Tampa, Fla.

Southern California Turfgrass Council, 14th annual exposition, Orange County Fairgrounds, Costa Mesa, Calif., Oct. 23-24.

Central Plains Turfgrass Conference, K-State Union, Kansas State University, Manhattan, Kans., Oct. 23-25.

Tidewater Shade Tree Conference, Norfolk Botanical Gardens, Norfolk, Va., Nov. 12.

8th Annual Turfgrass Conference, Clemson University Cooperative Extension Service, Clemson, S.C., Nov. 12-13.

New Jersey Turfgrass Expo '74, educational conference and trade show, Sheraton Poste Inn, Cherry Hill, N.J., Dec. 2-5.

Midwest Association of Golf Course Superintendents, 22nd annual turf clinic, Medinah Country Club, Medinah, Ill., Dec. 3.

Ohio Turfgrass Conference and Show, Ohio State University, Columbus, Oh., Dec. 3-5.

National Agricultural Aviation Association, convention/exposition, Las Vegas, Nev., Dec. 3-7.

Delaware Turfgrass Conference, John M. Clayton Hall, University of Delaware, Newark, Del., Dec. 9.

New England Chapter, International Shade Tree Conference, 11th annual meeting, Kings Grant Motor Inn, Danvers, Mass., Dec. 11-12.

industry news and newsmakers

Scientist Studies Pollutant's Effect on Woody Plants

Plant physiologist Bruce R. Roberts of USDA's Agricultural Research Service (ARS) is finding significant differences in the abilities of woody plants to take up sulfur dioxide (SO_2), a major air pollutant, from the space immediately around their leaves. Red maple, white birch and sweetgum seedlings have been shown to take up more SO_2 than rhododendron, white ash and azalea seedlings.

Using controlled temperature, light and humidity in a growth chamber at the ARS Shade Tree and Ornamental Plants Laboratory, Delaware, O., Roberts is gaining basic knowledge about relationships between woody plants and air pollution. He hopes this knowledge will enable him to recommend to city planners which trees, shrubs or combinations of plants would be most suitable as "pollution fighters." New understanding also may help scientists find ways to protect plants from pollution damage.

Of the major air pollutants — ozone, SO_2, nitrogen oxides, ethylene, and fluorides — Roberts chose to work principally with SO_2. This pollutant can be used as a radioactive tracer to find out what happens to the gas after it enters the woody plant. Roberts has observed that SO_2 molecules are chemically altered soon after they enter the leaf — first they are oxidized to sulfites and then to sulfates. Some sulfuric acid may be formed, which might account for some of the pollution damage to plants, Roberts said.

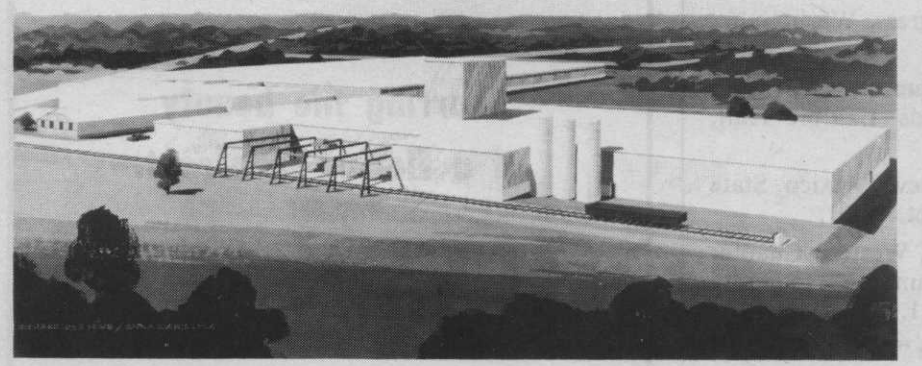
Photosynthesis can be affected by SO_2 pollution. The pollutant damages chloroplasts in the plant cells where photosynthesis takes place. Roberts hopes to be able to diagnose the type and extent of pollution damage by examining affected cells.

Studies have indicated depression of photosynthesis. Red maple seedlings fumigated with 1 ppm of SO_2 for four to six hours took up slightly more carbon dioxide than unfumigated seedlings. In contrast, leaves of seedlings exposed to an SO_1 concentration of 6 ppm were severely damaged, permanently depressing photosynthesis. Seedlings exposed to 4.5 ppm were damaged, but their ability to photosynthesize rebounded rapidly.

Roberts' SO_2 experiments indicate that, unless plants are injured by the pollutant, uptake remains constant — at least over a six-hour period. In some species of woody plants, he observed that the amount of uptake varied little, whether they were exposed to SO_2 concentrations of 1 ppm or 0.2 ppm.

"We're not sure exactly what happens here," Roberts said. "I think it involves the pollutant's effect on stomatal opening."

Roberts theorizes that stomates in the leaves of shade-tolerant trees may open and close faster, making these trees also more tolerant to pollution. If this theory is borne out in further studies, plant breeders will be better equipped to select trees for pollution tolerance.



Construction has started on this all-electric foundry for The F. E. Myers & Bro. Co., Ashland, Ohio. The $5 million, 110,000 square-foot facility is scheduled for completion in late summer, 1975.

Two More Seasons of Tight Fertilizer

The nation can expect continued tight fertilizer supplies through 1975 and 1976, said Robert C. Gunness, vice chairman of Standard Oil Company (Indiana).

Gunness said that nitrogen fertilizer shortages have developed during the 1973-74 season both in the U.S. and throughout the world, and the outlook is for continued domestic shortages during the 1974-75 and 1975-76 seasons. Domestic demand has risen sharply in the past two years. While Gunness views the probable shortfall at closer to five percent, he said estimates of the current U.S. shortage vary from five to 15 percent.

U.S. ammonia capacity, the source of nearly all nitrogen, has been flat since overexpansion in the 1960's brought on drastic declines in ammonia prices. One new plant is scheduled for the early part of 1975, but no further additions to domestic capacity are expected until 1978. The result is the U.S. will have to look to increased imports to meet the higher demand for nitrogen fertilizer over the next several years. With foreign supplies of nitrogen also tight, it appears unlikely that enough will be available on world markets to fully meet U.S. needs, Gunness said.

As for phosphate, Gunness said considerable additional capacity is scheduled to come on stream in 1974 and 1975, and the current shortages of about eight percent are expected to be eliminated by the 1975-76 season. Ample supplies of potash, both now and in future years, are expected because North American production capabilities, especially in Canada, are considerably greater than expected demand levels.